

Reading Room.

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THE CORNELL COUNTRYMAN



WOOD AS FUEL

G. H. COLLINGWOOD

THAT KITCHEN GARDEN

H. W. SCHNECK

THE WHY OF "JUNE DROP" OF FRUIT

A. J. HEINICKE

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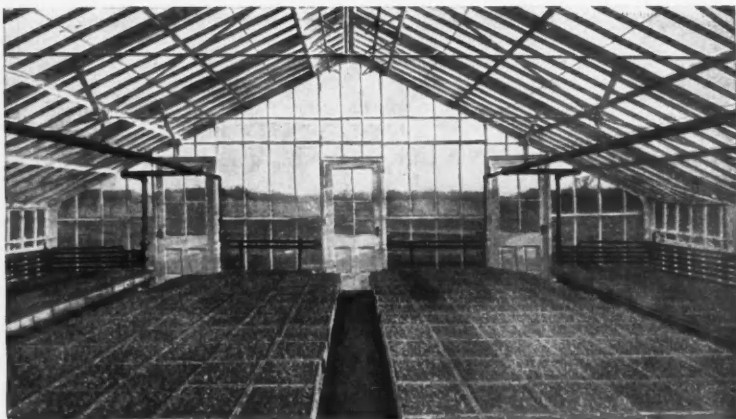
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" My tall dark pines, that plumed the craggy ledge
High over the blue gorge, and all between
The snowy peak and snow-white cataract."

ALFRED LORD TENNYSON

THE CORNELL COUNTRYMAN

Vol. XV

ITHACA, N. Y., FEBRUARY, 1918

No. 5

Wood as Fuel

By G. H. COLLINGWOOD

Assistant Professor of Forestry at Cornell University

THE old oak stove and the sheet-iron heater were several years ago relegated to the woodshed, or sold to the junk-man. By the time the wood-burning stove found its way out there, the woodshed had long since ceased to be a storage place for fuel wood, and had become a sort of catchall for everything from garden tools to rusty sleds. It is quite natural that all this should have happened, for it was no longer economy to burn wood. Coal could be secured so cheaply, it was so convenient, so compact, and held its heat so long that not only townspeople but farmers more and more used it in their homes.

In 1880 with a considerably smaller population, the United States was using 146,000,000 cords, or about one cord per person. The present consumption is about 100,000,000 cords. It has been estimated that in New York State there is being used approximately 3,000,000 cords of wood annually. Most of this is being cut from farm woodlots of which there are nearly 4,500,000 acres.

During the past year with the increased manufacturing due to war industries, and the congested transportation conditions, the fuel situation has

rapidly changed. Without government control of prices, there is no telling how high the price of coal would have soared. There is an actual shortage of over 50,000,000 tons of bituminous coal, and unless the strictest economy is practiced, we are threatened with

increased hardships

There is an actual shortage of over 50,000,000 tons of bituminous coal, and unless the strictest economy is practiced we will be threatened with increased hardships as the war continues. The use of wood for fuel offers the most immediate solution of the problem.—G. H. Collingwood.

as the war continues. The use of wood for fuel offers the most immediate solution of the problem. Considering a cord and a half of good grade, air-dry

hardwood as the equivalent of a ton of bituminous coal, this shortage can be met by an increased output of 75,000,000 cords of wood, or by practically doubling the production (and consumption) of cordwood for the country as a whole.

The railroads consume one-quarter of the coal used in the country, and coal transportation makes up about forty per cent of the total railroad business. Upon this basis it takes about one ton of coal to transport ten tons. A saving of 2,000,000 tons in the consumption of the state would therefore mean an additional saving of 200,000 tons of locomotive coal. What is of still greater importance, is that it would make possible the shipping of from 40,000 to



New Growth About a Clearing

50,000 carloads of other freight more essential to the welfare of the country. By selecting only the overmature, stag-headed, dead, and mis-shapen trees, and by utilizing all of the tops and mill waste, this could be done for several years in succession without injuring the woodlots in the least. In fact, if carefully done with continual thought for the future, this will undoubtedly result in improved growing conditions within the woodlot.

New York State with a normal production of 3,000,000 cords from 4,500,000 acres of woodlots could meet this war emergency by cutting one and a third cords from every acre, making a total of 6,000,000 cords. This will take the place of 4,000,000 tons of coal, and will save 2,000,000 tons from the present consumption.

The problem of saving coal by burning wood rests chiefly with the farmers and residents of small towns. In fact, conditions seem to indicate that many of these people will be forced by the lack of coal to burn wood or freeze. The two main reasons for this are that wood is much more bulky to be shipped in

large amounts by the railroads into the cities, as it takes two and a half pounds of good air-dry hardwood to equal a pound of coal, and that the smaller towns and rural communities do not have the facilities for attracting coal as do the larger cities. Of most importance is the first reason, for, with the already congested condition of the railroads, it would be most unwise to attempt to burden them with another bulky commodity. Farmers should therefore be encouraged where ever possible to burn wood instead of coal, and to draw into town for sale any extra amount which they may have. The demand for wood is chiefly dependent upon the supply of coal, and consequently attractive prices for wood are attainable when coal is scarce. Present cordwood prices in Ithaca, New York, are from twelve to thirteen and a half dollars per four foot cord.

The fuel value of wood is chiefly dependent upon its specific gravity and the percentage of ash. Generally speaking, however, the heavier the wood the greater its value as firewood. The following table shows for our im-



A Young Stand in Need of Thinning



Ready for the Ax

portant tree species the weight per cord of air dry wood, and the equivalent fuel values in terms of coal:

	Weight per cord	Equiv. fuel value of coal
Hickory -----	4500	1
White oak -----	4300	1
Sugar maple --	4000	7/8
Red oak -----	4000	7/8
Beech -----	4000	7/8
White ash -----	3800	4/5
Gray birch -----	3500	3/4
Red maple -----	3500	3/4
Pitch pine -----	3500	3/4
White elm -----	3000	3/5
Norway pine --	3000	2/3
Chestnut -----	2500	1/2
White pine -----	2200	2/5
Hemlock -----	2200	2/5

Altho air-dry wood burns readily, it contains approximately twenty-five percent of water by weight. Freshly cut green wood contains fifty percent moisture, which reduces its fuel value to sixty-five percent that of air-dry wood. As a general rule, it takes twelve months to reduce this to twenty-five percent. Drying takes place most rapidly during the first six months after cut-

ting, at the end of which time it contains only thirty-five per cent moisture. Wood cut and properly stacked seasons much more rapidly than when left in the log.

Because green wood is only sixty-five percent as efficient as dry, it is apparent that this year's fuel situation must be met by wood already cut and stacked, by partly seasoned, standing, dead timber, and by the use of tops and cull logs left over from previous logging operations. Every possible effort is being made to attract a considerable supply of this wood into the smaller towns in order to relieve the fuel shortage. Considering the question of seasoning, it is clear that wood must be cut this year in order to provide a supply against a coal shortage again next year. To the farmer this means an opportunity to clean out and improve his woodlot at a very good profit. The prudent householder, on the other hand, will view his cordwood as an "ever present help in time of need" and will look to it that he has a good supply drying out in his cellar ready for any emergency of another year.



The Finished Product

My First Experiences in Apple-Growing

By R. E. CLARK, '11



IMMEDIATELY after leaving Cornell University in 1911, I began work on my father's fruit farm, "The Homestead." At first there were only thirteen acres planted in apples, seven acres of which were then bearing. These had been planted twenty-one years before and consisted mostly of the Fameuse variety. At the present time, there are altogether twenty-eight acres, and about thirteen bearing fruit. Nearly all of the young trees that had been planted for the last four years were trees which I grew myself. I bought one year seedlings and root-grafted them with scions from the hardiest and best-producing Fameuse and McIntosh varieties, varieties that seemed to be best adapted to the soil and the climate conditions. The home-grown trees are better than those bought from the nursery, as the nursery-bought material cannot always be depended upon to come true to name.

This orchard, although it had always been pruned well and otherwise given the best of care, never had been sprayed. That meant a large percentage of poor quality fruit. I consider spraying to be one of the most important factors in the proper care of an orchard and one in which it pays to keep the spray equipment and methods always as efficient as possible. My hardest enemies to fight so far have been the green aphid, the scab, and the apple maggot, altho this year a fungus has proven troublesome, due to the wet season. The first spray I used, was a dust spray; it was effective enough for the codling moth, provided the weather conditions were right.

But as it did not destroy the scab and the aphid, it was replaced with an outfit that I rigged up myself from a large-size hand-pump and a hundred and fifty gallon tank. The next year I decided that while a hand-pump was good, a force pump was better, so I bought a gasoline engine, which was in use up to the present time. Now, however, the orchard has so increased that this is no longer large enough, and a new up-to-date outfit had to be purchased. All the fruit-tree pests will not now have a chance of escaping.

In regard to thinning, I might say that, while in the past I have not thinned the fruit very extensively, nevertheless I firmly believe in it. I know that last year's crop, particularly on the Fameuse trees, would have been much larger had thinning been practiced. But all the apples that naturally dropped were picked up, thereby decreasing the spread of such diseases as the apple maggot.

Usually the largest amount of the crop has been packed and delivered f. o. b. to the loading station. However, some of the fancy packages have been sent directly to the consumer in Brooklyn, New York, my nearest big market. One man took charge of the shipments and distributed it among his neighbors. Such a trade calls for a fancy grade of stock, but the price is generally paid without much trouble, provided the quality is good. This trade not only gives the grower a higher price than otherwise could be obtained, but it also gives the buyer the benefit of wholesale prices. The greatest objection is the additional labor required in packing; last year all of the fruit was packed in barrels on account of the scarcity of labor. This was quite a disappointment but shows that conditions are constantly changing, consequently demanding different methods of procedure.

That Kitchen Garden

By H. W. SCHNECK

Assistant Professor of Vegetable Gardening at Cornell University

MANY people are attempting to help solve the high cost of living problem by producing a part or all of the vegetables needed by the family throughout the year. Some people are making vegetable gardens for the first time. Serious mistakes have been made during the past year and many will be made this year.

One of the most frequent mistakes made by amateurs is in the selection of a location for the garden. The sunniest and warmest place possible should be chosen, far away from large trees which shade and take large amounts of vegetable plant food and moisture from the soil.

In selecting a location, many people give too much attention to soil. Any kind of soil may be selected to start with, and by judicious management, it can be improved and made suitable for vegetable production. The soil in most backyards is of a clayey nature, sticky when wet and hard and compact when dry. Such a soil dries out very slowly in spring, and consequently, is not adapted to the growth of early vegetables. By spading a clay soil in the fall, leaving it in a rough condition over the winter, and adding coal ashes and lime in the form of ground limestone at the rate of ten pounds per hundred square feet per year, its texture may be greatly improved, making the soil much more workable. The best material to add to

the soil to improve its texture is strawy manure. In addition to improving the mechanical condition of the soil, stable manure supplies plant food, without a sufficient quantity of which, plants cannot thrive. It may be applied fresh or in a rotted condition. If applied fresh, it should be spaded under in fall but if in a fine well-rotted condition, it is best applied after spading in spring, mixing it well into the surface soil.

One of the most serious causes of failure with beginners in home gardening is the lack of a well thought out plan to follow when planting time arrives. Plans should be made



An Essential Feature of Gardening

during the winter months so that seed, tools, and fertilizers may be ordered early and everything will be in readiness at planting time in spring. The plan should be drawn to scale and should indicate the size and shape of the garden, the location and amounts of different vegetables, the direction of the rows, and the distance between them. It is really a map or picture of the garden as it should look when planted.

The vegetables should be planted in straight rows which extend from one side of the garden to the other. By means of the plan, the rows may be laid out in the garden by use of a yard stick, stakes, and a garden line. In making a furrow, the line should be stretched tightly between two stakes, one on either side of the garden, and

should be close to the surface of the soil. The furrow may be opened by drawing the end of the hoe handle along the line. The seeds should be sown and immediately covered before the soil which comes in contact with them has dried out. The quickest and most efficient way of sowing most seeds is by means of a long envelope which has been cut so as to form a sharp edge, the seeds being dropped from the broad side. Immediately after covering, the soil should be firmed over the seed by using the back of the hoe blade. This firming is very essential, especially on sandy soils or in dry weather, in order to bring the seeds in intimate contact with the soil, so that they may secure soil moisture and germinate more rapidly.

Lack of cultivation is one of the most prevalent causes of failure with home gardens. After the seedlings appear at the surface of the ground, the surface soil between the rows should be kept loose and dry by cultivating with a hoe or rake soon after every rain or every week or ten days between rains. The chief object of cultivation in the home garden is to hold moisture in the soil and prevent it from coming to the surface and being evaporated and lost. Many people still cling to the old fashioned notion that the only purpose of cultivation is to control weeds. If the garden is cultivated sufficiently to conserve moisture in the soil, weeds will never give trouble.

The all-too-common practice of rushing to the corner grocery store when planting time arrives in early spring to purchase highly colored packets of vegetable seeds, ought to be discouraged. Although some of this seed is good, a great deal of it must be used with caution. A much better plan is to anticipate the garden needs long in advance so that the seed order may be prepared and sent to one of the many reputable mail order seed houses. If any considerable area is to be planted, it will be more economical to purchase seed by the ounce rather than by the packet.

Any vegetable garden seed, with the exception of carrot, parsley, salsify, parsnip, and onion, which is not used this year, may be saved for next year's planting.

Most home gardeners sow vegetable seeds too thickly. This practice is wasteful of seed and necessitates a great deal of needless labor in thinning. In addition to sowing seed too thickly, many people neglect to thin the seed-



Keeping Continually at It Brings Success, an Abundant Supply of Fresh, Wholesome Vegetables, Unequaled in Flavor

lings and as a result very few, if any, good vegetables are produced when crowded together in the rows.

If a well thought out plan is made during the winter months, and the garden soil is well prepared and fertilized, and good seeds are sown in the proper way, the home garden may be a source of much pleasure, recreation, and above all, furnish a means for many people to do their "bit" toward "making the world safe for democracy."

How Should I Market My Fruit?

By HERBERT P. KING, '00

THE growing of fruit, like "All Gaul," is divided into three parts.

The first is the selection of the site and of the varieties; the second is the growing of the varieties selected to perfection; the third is marketing. Of these, marketing presents the greatest problem, because of the utter lack of control over the conditions that govern it.

There are two entirely different ways of marketing fruit. One is to sell direct to the retailers or the consumers, and thereby eliminate the middleman's profit. This necessitates advertising the fruit and finding customers. It necessitates also a good, honest pack, and a fairly constant supply of fruit so that the customer may have it as he needs it. The grower must know the demands of his customers and the price they must pay elsewhere, for competition must be met and the customers must be kept satisfied. The advantage of this way of selling is of course in the higher prices received. The disadvantages are the greater care required in packing in order to meet the needs or the whims of the different customers, the much greater number of orders to be filled, and the greater number of accounts to be kept.

By this method of marketing, the grower is not able to handle easily an excess of fruit that may ripen faster than usual. For example, in the handling of a very perishable crop, such as peaches, a few hot days will ripen them more than twice as fast as usual, and the grower may have on his hands a good many more than orders call for. This excess must be removed at once or it will spoil, and therefore, it is generally sold at a loss. Then, too, the uncertainty of a crop of fruit each year makes it hard to hold customers, for in a year when a certain grower has no fruit his customers must buy elsewhere and his market must be won over again.

The other way of marketing fruit is

to turn it over to a commission man or buyer and have him sell it. If the orchard is in a fruit region that is frequented by buyers, the crop may in many cases be sold either on the trees or immediately after picking, the buyer assuming all the risk of packing, shipping, and selling. Of course he expects to buy low enough to compensate for the risk, and the grower takes the low price because the crop is handled with so little trouble to himself. This is the easiest way to market a crop of fruit, and, if satisfactory prices are obtained, is a very profitable way. In shipping to a commission man, several things are essential. First, the grower should know the commission man, his reputation, and his financial standing; second, the grower should know whether the buyer is specializing in selling fruit and not giving most of his attention to other kinds of produce, in order to be sure that he has a regular trade in fruit; third, the grower should know whether his varieties will sell well with the buyer's trade; and last, during the shipping season, he should keep the buyer advised in advance as to what there is to be shipped, so that he may plan the selling to the best advantage. It is generally better for the grower to ship to only one commission man in a place, and let him work up a market for that particular brand of fruit. If the brand is worthy, the commission man will generally soon be able to get for the grower a little more than the market price for it. In some cases it is possible to arrange with the buyer to sell only the one brand of fruit during its season, and the grower expects to furnish all that can be sold. It is always best to have a commission man in each of a number of different places, for often two places comparatively near together will vary considerably in the prices at which fruit is selling.

In selecting the place to which fruit

(Continued on page 286)

And What Shall the Harvest Be?

By EUGENE HICKS

Heredity plays a very important part in the development of the race by acting as a drag, or an elator or stimulator. It acts as a drag, in that it permits the undesirable characters of a race, such as murder, theft, lying, treachery, suicide, alcoholism, editing and disease to be carried along from one generation to the next. It acts as the mud on the wheels of progress, and if no hose is applied to wash it off, the wheels are going to sink to the hubs and stop. Knowledge is the hose. We must be the manipulators. We must put the hose in the hands of the unfortunates, teach them the fundamentals of life and breeding, tell them the how, the why, and the wherefore in a way that they will understand. With five trillion people it is discouraging, but, if we teach two people, and they teach two more, it will not be long before the five trillion have been educated to an understanding of their responsibility.

Did I say, "heredity acts as a stimulator"? To be sure it does. By the crossing of genii, both musical, spiritual, and all other *als* of the human race, we approach a degree of concentration, nearer the limit than it ever was before. But where is the limit? Are we nearer it now? Heaven forbid! Do the men who have lived and are living represent the highest types in their respective classes? Have we nothing more to do than to develop a race that will be their equal?

Look for your type where you will. Napoleon was a military genius, but a licentious, egotistical devil. Our business men of our big cities are keen in intellect and ability, shrewd and economical. They represent the commercial side of life. But go to the "Great White Way," where the "*elete*" are carousing. Here we see women smoking, drinking, tantalizing the "moths" that want to get their wings singed—a noble contrast! What type will you have?

As an elator and a stimulator, it gives us ideals to look up to. We must choose our ideals. Then what? Let us pray for results.



The Why of the "June Drop" of Fruit

By A. J. HEINICKE

Assistant Professor of Pomology at Cornell University

WITHOUT flowers there can be no fruit. An abundance of flowers, however, is not always followed by a good yield of fruit. Apple trees are sometimes covered with blossoms in spring, but yield little or no fruit in the fall. Even under normal conditions, only five to ten per cent of the flowers that open finally remain on the tree. Many are lost a few days after the petals fall, and a large number of partially developed fruits drop from the tree during the next few weeks. This is followed by a rather conspicuous loss commonly called the "June drop" which occurs in June and July when the apples are from three-eighths to one inch in diameter.

Studies that have been in progress for several years point to the conclusion that the set of the fruit is closely associated with the nutrition of the flowers and partially developed fruits. Only those which receive an abundance of

food and water will remain on the tree, while the poorly nourished fall during the "June drop" or before.

The nutrition of the newly formed fruit is influenced to a large extent by pollination and fertilization. The germination of the pollen on the stigma and the growth of the pollen tube down the style seem to afford a stimulus which increases the supply of sap to the fruit. Then the development of fruit begins at once, as indicated by the enlargement of the ovary and receptacle of the flower. Otherwise, they will drop a few days after the petals fall. The influence of pollination, however, is not sufficient to cause a permanent set. The partially developed fruit will be lost unless fertilization, the step following pollination, occurs. Good fertilization results in a larger number of strong seeds, a greater stimulus, a greater sap supply, and the resulting larger number of set fruit. This is indicated by the

fact that very few fruits having many seeds are found among the "June drops."

Since the development of the flowers and newly formed fruit is made largely at the expense of stored food, it follows that the amount of such food is also an important factor in their nutrition, the greater the amount the better the set of fruit. This supply is reflected by the vigor of the strong flower-bearing spur, which is longer and usually stockier than the weak spur. Both are of the previous season's growth. That more food is available in the more vigorous, is shown by the fact that the cluster base is heavier, the leaves are larger and more numerous, the number of flowers to the spur is greater, and the lateral growth from the cluster base is more abundant in the vigorous spurs. Such vigorous flower-bearing spurs are more productive than weak spurs. For example, 215 of the 320 vigorous spurs from branches of a Baldwin apple tree produced fruit, whereas only 91 of the 357 weak spurs from the same branch held fruit.

Vigorous spurs are also provided with large conducting tissues which seem essential for the easy and abundant passage of water and dissolved food material from the wood to the flower and developing fruit. This abundance of moisture is essential for the proper nutrition of the newly formed fruit not only because all food is dissolved in water but also because water enters largely into the composition of the fruit. Unless a continuous stream of the watery sap passes from the cluster base to the flower or fruit, an abscission layer is formed which results in the loss of the fruit by the cutting off of this sap.

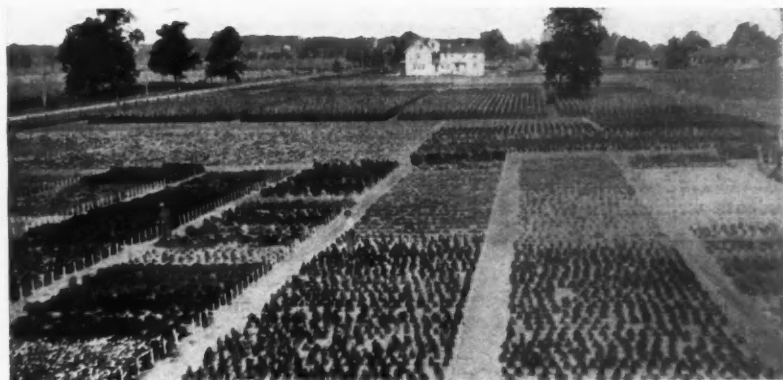
It has been mentioned previously that seeds are necessary to stimulate the sap supply to the fruit. Comparatively little stimulation is required to draw the sap thru the well developed conducting tissues of vigorous spurs. Consequently, fruits might be expected to set on such spurs even though they had few seeds. Considerable stimula-

tion, however, would be required to insure a continuous flow of sap to fruits on weak spurs with poorly developed conducting tissues. This increase in stimulation is caused by those apples remaining on these spurs and which contain many strong seeds. Data similar to the following indicates that this is true. In the case of Fallawater branches, the average weight of the cluster bases of 39 spurs which held few seeded fruits was 3.41 grams. The average weight of the cluster bases on the remaining 30 spurs which held many seeded fruits was 2.44 grams. The weight of the cluster base, as already mentioned, is an index of vigor. The average weight of spurs bearing few seeded fruits is greater than that of spurs bearing many seeded fruits, because in the former case only vigorous spurs are involved,—all few seeded fruits having fallen from the weak spurs,—while in the latter case fruits are held by the weak as well as by the vigorous spurs.

If the tree is abundantly supplied with vigorous flower-bearing spurs, a crop of fruit may be obtained in spite of poor seed production. The formation of these vigorous spurs involves such factors as a suitable location with respect to both climate and soil, the control of diseases and insects, the thorough tillage of the soil, and proper pruning. Varieties grown beyond their climatic range cannot be expected to set fruit unless many strong seeds are developed and this often requires cross-pollination. Trees on weak, shallow, or poorly drained soils will set little fruit regardless of their power of producing flowers. Little food can be stored by trees whose foliage is injured or destroyed by diseases or insects. More seeds will be required to bring about fruit setting on trees grown in sod than on those grown in well tilled orchards.

The set of fruit is influenced to a large extent by the weather at blooming time and shortly after. If the days are windy, cold, cloudy, and rainy, only

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Commercial Seed Growing

By VICTOR M. BUCK, '16

EVERY business must have a central point. In the seed industry the warehouse is the headquarters. This is generally located at some industrial center where the best means of transportation are available. Seeds sent here by the growers are placed in bins or bags. From these the seed is placed in different receptacles for the retail trade and sold.

Nearly all the seed that immediately goes to these warehouses is grown by contract as it would be impossible to grow all of it on one farm, even if soil, climate, and other conditions were favorable, because of the space it would require. Therefore, farmers or special growers produce it for them. The seed supplied these agents is grown by the company on the stock seed farm. This has for its chief purpose the improvement of strains

Connected with the seed farm and a forerunner to it, are the trial gardens and green-houses. The gardens are the most essential part of the entire business and no company should be without them. All seed to be grown on the

farm should be tried out in the gardens before being utilized. All samples on trial are labeled and then sown in forty foot rows. The trials occupy only a small part of the entire ground as the rest of the land is used for cropping and upbuilding with legumes and fer-

tilized crops. In this way, new soil is available for trials every three years. In the trials, the pureness of the seed, the trueness to type,

the general characteristics, and the productiveness are obtained and compared thruout all varieties. A thoro study of the varieties is made during the entire growing season. Notes are taken and written observations made during this time, the first being made at the market stage and another at maturity in accordance with evenness of growth, productivity, and drought and disease resistance.

Inasmuch as seed plays such an important part in plant production, the plant grower tests all his seed before giving it to the public. Seed testing must be carried on through the year but will be greater at certain times, namely

at the close of the fiscal year and when new stock comes in. All seed is thus tested twice a year. Such seed as celery, beets, and sweet peas can not be tested accurately during the warmer months of the year because they will not germinate well except under cool tem-



Many varieties are grown together and their comparative worth noted

peratures. So the bulk of these seeds are left for the cooler weather.

For the testing, greenhouses are necessary and every seedsman has at least one. These are divided into two compartments, one for the cooler plants (42° - 50°), and the other for such warmer plants as radish, lettuce, and asters. Some of these warm plants do best when placed on benches with enclosed heat; among these are corn, tomato, and nasturtium. A standard tester, such as is used for cucumbers and squash, maintains an even temperature between eighty and ninety degrees. Flats containing tomatoes and okra should be placed on a warm bench with an inverted flat over them, so as to shut out the light and hold in the heat, thus insuring a more even germination.

A rich sandy or humus loam is best for seed testing. Quick germinating seeds as corn and beans grow better in a sandy soil, while such seed as parsley and pansies need more humus. The seed is sown in flats, a hundred of the smaller seeded varieties being used for a test and only twenty-five or fifty of the larger. A sharp edged marker is used to make a shallow trench in which the seed is placed. All the smaller kinds are counted on a metal dropper with a

spring release. The larger are dropped by hand while such seed as pumpkin and lima beans are set in the soil on edge to prevent rotting. Lettuce, endive, and spinach are planted still differently: they are placed in trough-like depressions and left uncovered except for blotting paper to shut out the light and to prevent drying.

Greater care should be taken in watering these test flats than is generally done in greenhouse practice. Too much moisture results in the seedlings damping off, while too little will not germinate the seed. So only a slight sprinkling should be given the flats at first, thus preventing the formation of a thick crust. Hereafter, they may be watered once or twice a day as the surface dries out.

When germination is complete, the seedlings are picked off and so counted. In seed testing work, the seed should be left one day longer than is the usual practice with seed germinating in ten days or less, and two to five days longer with those requiring more than ten days to germinate. The reason for this is that unless sufficient time is allowed for the test, the vitality record will not in every case be authentic, due to an unevenness in watering or to an insufficiency of heat at some time during germination, although both of these things may have been carefully guarded against.



All seed must be dried immediately after being harvested. Some are removed from the plant and dried artificially. Others as peas and beans are cured without being threshed but are hauled to a shed or outdoor drier and placed on racks a foot or more in length.

II. Rural Dramatic Extension

By RUSSELL LORD, Ex-'18

THE thesis which we have laid down for this paper is that in extending aid to the development of country-side dramatics, the agricultural college should not seek to make of them a sort of glorified farmer's institute "teaching valuable lessons." Realizing rather the essentially artistic basis of all drama, even of the naive "shows" which county folk get up on their own accord, it should strive to raise the artistic standard, doing away with mail-order trash now prevalent, and bringing to the people such plays, old and new, as will stir a hidden human desire for self-expression and, as a leader in the work puts it, "help them find themselves." There is as great, and in a sense as practical, a need of this as there is of more silos.

Country people seem to shrink from expressing themselves even to themselves. They indulge in few emotional experiences, either of hearty mirth or outright grief. The old Aristotelian idea of drama as a sort of purgative for pent-up-ness of the soul applies here with particular force, and may explain why they are so pathetically contented with such poor entertainment as most of their shows provide. The psychology of their laughter at the crudest manifestations of minstrel humor, or of their sadness at the crudest pathos of the cheapest melodrama, is comparable to that of a student who will roar with real laughter at the slightest untoward incident toward the end of a long lecture hour. There is a good deal of sound sense in the way of a woman "having her cry out." "In some such manner," says Aristotle, "is the audience of a tragedy purged of pity and fear, or in the case of a comedy, of undue anger and astonishment, and is made more fit for the temperate and equitable discharge of commonplace daily duties." If you can make a country audience laugh or snifle, you will have rendered a real service to the community, that you will have tempered its

mood, and made its morrow truly a new day.

It is not right to shrink from this fundamental purpose of the drama, simply because of its subtlety. It is misleading to exalt too highly the more tangible sociological usefulness of the gathering which the country play first ushers excuses for, the leadership it inspires, the coöperation it instills. And it is no less than disastrous to miss the point so far as to justify state-college aid to rural dramatics on the "valuable lesson" fallacy. For "practical" propaganda in play form is bound to fall short both of being a play and teaching a lesson. There is neither sense nor honesty in sugar pills.

As the writer sees it, this attempt of the agriculturist to use the rural drama for purposes of education-on-the-sly is quite in line with a prevailing point of view. Many zealous missionaries run wildly about in the rural field these days, violently willing to waylay anyone and impart their enthusiasm. The writer has done some such running about himself and is sympathetic with the enthusiast who would slip over his idea in any form whatsoever, but he has come to entertain even a deeper sympathy with the poor devil who so patiently has served at the receiving end—the Long-Suffering Farmer. Isn't he entitled to a little entertainment after all of his lessons, and isn't that precisely what the drama is for?

Of course, the drama itself is nothing if not didactic or instructive; the entire source of dramatic interest lies in the "recognition of the familiar" and the "delight in discovery" (Aristotle: *Poetics*). But the delight is in the discovery of the universal, not the particular; it is educating, not merely informing. "The primary passion of the human race is for knowledge," but this does not mean merely facts.

We have seen what has been done in

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The Individual and the Nation's Clothing Supply

IN the days of our grandmothers, the question of clothes and of the choice of textiles afforded little trouble. The yarn to make "husey woolsey" was spun at home from the wool of the sheep, also the flax from the linen. Later, machinery replaced the hand loom, and woolen cloth of different weaves and designs came on the market. Cotton was refined by the famous cotton gin and made into cloth. Silk was used to some extent. Cloths of all sorts were comparatively cheap and plentiful.

Today, different conditions exist. The wool for American mills, instead of being produced in the United States, comes from England, Australia and Russia; but the war and transportation difficulties limit the supply. Sheep, it is true, are raised in this country, but not for wool; mutton and spring lambs are more profitable.

The countries which raised flax are fighting, and their fields are so ravaged that it will take a hundred years to restore them. Farmers in this country raise flax for seed rather than for fiber. The seed is used mostly for medicinal purposes, and also in some cattle feeds.

Before the war, one out of every three cotton crops was sold at a loss on account of over-production. This year, the yield is from one to two million bales below the demand, on account of such agricultural conditions as a poor season, a shortage of fertilizers, and in increase in corn crops. The war itself consumes a tremendous amount of cotton. A twelve-inch gun needs one-half a bale of cotton for every shot. The munitions factories demand a million bales of cotton for explosives. If these materials are furnished, the supply in the country must be conserved.

The shortage of wool is still more acute, since every one of our soldiers

needs warm woolen clothing. So when we figure out not only how many soldiers we have at the present time, but also how many more at a near future time, we see that tons and tons of wool must be used. The United States is meeting the subsequent shortage of wool by the elimination of all padding in coats, by shortening coats six inches, and by enlisting the coöperation of the garment-workers. The manufacturers are placing on the market materials woven of cotton and wool. They are also discouraging the use of wool for purposes other than those absolutely essential for comfort. In other countries, especially Austria and Germany, they are substituting wool cloth with nettle and paper cloth.

Even the aristocratic silk has been drafted into the national service. It is being sent to France to the soldiers, for when silk is worn next to the skin, there is much less danger from blood-poisoning if the silk fabric is driven into the wound.

Now is the time for the housewife to bring down from the attic all the old-fashioned garments. Wool coats and suits can be made into dresses with the help of georgette and crepe; full skirts can be remodeled into dresses; linens can be made over for household use or given to the Red Cross.

As individual women, all may help to conserve the nation's clothing supply in any of the following ways: by buying less wool, by accepting the lighter weight material and thereby saving labor for extra processes, by demanding a smaller assortment of colors, by avoiding extreme styles, by choosing one color for a season's wardrobe, and by planning a budget for clothing which shall include not more than twenty-five percent of the income.

CORNELL girls are making a strenuous effort to be of help in all kinds of war work.

Last spring, by means of the pageant, tea dances, and a "tag day," the girls raised enough money to purchase a staff car for the use of officers at the front. This car is now on active duty "somewhere in France."

This year, the various activities have so increased in number that they have been divided into nine units, each of which has a student chairman and at least one advisory member selected from the faculty, or the Ithaca Red Cross chapter. The first three units are from the Cornell Women's Red Cross Auxiliary, and the remaining six are of local origin. All are organized under the women's mobilization committee.

A report of the committee is as follows:

The knitting committee has given nearly \$200 worth of yarn; many sweaters, helmets and wristlets are being constantly forwarded to the men here and in France.

Two hundred comfort kits are being made.

Two hundred and eight Christmas packets were donated and sent to men in active service in France.

A tea dance was held in the Sage gymnasium and \$140 was raised for knitting supplies.

Instructors in surgical dressings are present at the workrooms in Barnes Hall, where girls stop in to work between classes.

An advanced course in First Aid will be started soon. Eight girls already hold First Aid Certificates.

A class of girls meets twice a week to drill out-of-doors in order to prepare themselves physically for whatever demands the unusual positions created by the war may make upon them.

Classes in automobile repairing, wireless, and Morse code are to be started soon.

The Y. W. C. A. raised by subscription \$3,600 for the Friendship War Fund.

One hundred and three Liberty Bonds were purchased by Cornell women.

A new unit has been started to take up the problem of placing girls on farms for summer work as fruit pickers and truck farmers. This work will be under the guidance of the College of Agriculture.

ELIZABETH ALWARD,
Chairman of Mobilization Committee.

Receipts for Wheat Saving Breads

The home consumption of wheat should be cut down as a war measure. Not one particle of wheat flour should be wasted and bread should be made, as much as possible, out of such substitutes as oats, barley, rice, and others. The following receipts were prepared by the department of Home Economics to help the housewife in the making of these breads:

Potato Bread

8 cups flour,
2 pounds, or 1½ quarts potatoes, uncooked, diced,
7 teaspoons salt,
2 tablespoons corn syrup,
2 cakes compressed yeast,
5 cups water.

Bean Bread

8 cups flour,
1 cup beans, uncooked,
2 tablespoons corn syrup,
5 teaspoons salt,
2 cakes compressed yeast,
5 cups water.

Rolled Oats Bread

8 cups flour,
2¾ cups rolled oats,
2 tablespoons molasses,
5 teaspoons salt,
2 cakes compressed yeast,
5 cups water.

Barley Bread

7 cups flour,
1 cup barley,
2 tablespoons molasses
5 teaspoons salt,
2 cakes compressed yeast,
5 cups water.

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ITHACA, N. Y., JANUARY, 1918

S. B. Duffies, '20, and L. A. Gray, '21, have been elected assistant business managers of *The Countryman*.

FARMERS of New York State, this college is yours. We are your servants. We swing wide open its doors and bid you welcome.

THIS year Kermis offers unusual attraction. For the first time the play is an original one—written by a man in training camp who took with him a well balanced and highly developed agricultural mind. This man is Russell Lord, '18, experienced in rural dramatics and with every qualification of an author, and a poet. The play is "They Who Till"; the place is Bailey Hall; the time is Tuesday evening, February 12.

"DOM ECON" is open this year, as usual, and you will get plenty to eat. The days are full with some three hundred practical lectures. Kermis is the attraction of Tuesday evening and here you may regress to feed your imaginations.

The author of Kermis once said, "We have mouths, and we have minds, and we have imaginations, and they all three need feeding."

OCCASIONALLY the American farmer goes to town. Uncle Sam is calling for money and this day the farmer goes in to purchase his Liberty Loan Bond. He sees the big crowd down the street and he goes to see. If ever there is a man who parades Broadway, with his eyes wide open, it's the farmer. He sees things which are mere commonplace to the common crowd. He sees the cabarets, the candy-shops, the busy saloons, and the crowded theaters. To the American farmer it is waste, waste, waste,—waste of time, waste of thought, waste of effort, waste of money, and at a time when, according to Washington, all these are needed to fight autocracy. He stops to think, he scratches his head, but he cannot understand. Slowly he turns about, deliberately walks back to the corner bank, and buys his bond.

ALREADY the United States has won battles. One was floating the First Liberty Loan. Another was floating the Second Liberty Loan. Some 10,000,000 persons saw the second loan to victory. But let us not be overconfident for the third must be the greatest—greater even than the first and second combined, which means that it must be larger than any loan of any kind ever floated anywhere in the world's history. More of us must subscribe and in larger amounts if we would see this third loan march to victory.

Investing in the Liberty Loan is not a sacrifice; it is merely a savings bank. It is a business proposition—commendable in peace as well as in war.

We are told that this war can never

be won until America changes her mode of living. New commodities must be produced and by—whom? For every man who enters the service the production of something else must be given up. For the production of every firearm, submarine, and airship, the production of something else must cease. We cannot build an army, feed our Allies in Europe, and at the same time enjoy all our former wants. "Two blades of grass cannot be grown where one formerly grew." We cannot draft our men into service, produce coal for our Allies, produce coal for transporting troops and supplies, and at the same time maintain our former desires: the theater, the candy-shops, the saloon, the pleasure cars, and—a multitude of mere *wants*. If legislation will not shut down these wartime absurdities, nonpatronizing them will.

Washington tells us that there is not enough capital, nor labor, nor coal, nor transportation, nor raw material to go around, if these industries which are not essential to the conduct of the war are continued at their present productiveness. There is no cause for debate, there is no chance for choice; these luxuries must go and the American people must sacrifice them.

At this moment America has the greatest obligation and perhaps the greatest opportunity ever offered any nation. "Let us learn our duty and then do it."

THE December report of the Federal Farm Loan Board, recently issued, is encouraging. It is notable, however, that the project is a great deal more of a success in the west and southwest than in the eastern districts, and New York is notably low among these states.

Of all farmers, those in the east are the most conservative and it is perhaps

right that they should be. But things are moving rapidly these days and we must hurry to keep up. All lines of business are short of help. Others are combating it by the introduction of more efficient methods. "That would be all right" says the farmer, "If only I had the capital back of me, but I have not." But he has; the capital of the Federal Government is behind him as perhaps it is behind no other industry in the country. Page 78 of the last November *Countryman* will show you clearly and concisely how to obtain it.

WE notice that the seed oats offered for sale by one miller in this state are oat-smut treated. This company should be congratulated on its foresight. With the plan once started competition will demand that every seed dealer sell only oat-smut treated oats. But more important than offering only *treated* oats is the assurance that they are *properly* treated. Much damage would result if supposedly treated oats were found to be infected.

WHAT are the prospects for the human race? "Not much," says the student who emptied his pen on page 272 of this issue.

Geneticists divide the human race into three classes. The middle class they assert is maintaining itself; the highest class is rapidly decreasing, while the lowest class is reproducing at an enormous increase.

Last year this state spent six times as much money in caring for the feeble minded and other degenerates as it did on educational institutions of all kinds. The figures are becoming more startling year by year. This is the condition that American civilization faces. Plato stated that this same condition would, in fact was, causing the downfall of Greece.



Campus Notes

As usual, the **Farmers' Week** program for "Farmers' Week" consists of talks on a most varied number of topics, treating of every phase of agricultural life. The farmer who is interested in animal husbandry will be able to hear talks on cattle, swine, and sheep and everything connected with them; the farmer's wife can attend lectures on cooking, sewing, and the growing of flowers and of kitchen garden vegetables.

The speakers consist mostly of members of the University faculty but there are many out of town speakers of note. Among these are included:

Julia Lathrop, connected with the Children's Bureau of the U. S. Department of the Interior; Jane Addams of Chicago; Dr. Alonzo Taylor of the U. S. Food Administration; Charles E. Thorne, Director of the Ohio Agricultural Experiment Station; Charles S. Wilson, the New York State Commissioner of Agriculture; David Snedden, Teacher of Vocational Education at Columbia University; John Mitchell, Chairman of the New York State Food Commission; L. D. H. Weld of the Commercial Research Department of Swift & Company and formerly professor of Business Administration at Yale.

At a meeting of the Round-Up Club held Tuesday, January 8, Professor M. J. Smith gave a talk on the "Sheep Industry in New York State."

In previous years, the **The "Ag" Agricultural Banquet** given on a rather large scale and a considerable amount of money was spent for elaborate menus. But this year, on January 12, instead of the usual banquet, an Agricultural War Dinner was held. Only simple foods were served and just enough. Neither meat nor wheat nor sugar were used but only their substitutes. The idea of a food conservation meal, however, did not keep the "Ags." away. There were more than four hundred present, completely filling the dining room of the Home Economics Building.

Professor Cavanaugh, '91, presided and introduced the several speakers. President Schurman, speaking on "Cornell and the War," told of the response Cornell gave to the call last spring by giving two thousand men to the cause, all of whom are now either in the training camps in various parts of the country or already serving in France. He emphasized the pride and appreciation that Cornellians hold for those "who have gone over."

Other speakers followed, Professor Bristow Adams, speaking on "Those Who Have Gone," Professor Martha Van Rensselaer on "Women and the War," and H. S. Sisson, '18, on "An 'Ag' College Daily." Charles G. Seelbach gave a musical stunt and a quartet sang several selections.

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FORMER STUDENT NOTES



Morgan

'08, W. C.—Professor A. G. Philips is one of the men going out from our College who have made names for themselves. Born in Pennsylvania, Professor Philips early moved to Kansas and in 1907 graduated from the agricultural college of that state. The following winter he spent at Cornell in the winter course and was also engaged in some special work here. In 1908 he received the position of assistant in charge of poultry husbandry in the Kansas State Agricultural College and remained there for two years. During his stay there he published two bulletins. In 1910 he attended the Graduate School at the Iowa State Agricultural College and during the same year he was offered, and accepted, the position of assistant in charge of poultry husbandry at Purdue University and has been there since that time.

When Professor Philips took the position, there was absolutely no equipment,

not even any fowls, at Purdue. The department has steadily increased in size and scope since that time. He worked at first under the animal husbandry department but this year poultry

was made a separate department. The department at present carries a staff of five men, two of whom are engaged in extension work. They have published twelve bulletins covering a variety of subjects relating to poultry.

Professor Philips rose rapidly thru the positions of instructor, assistant professor, and associate professor to a full professorship in 1915. This year he is at the head of the poultry department. He was

also recently elected president of the American Association of Instructors and Investigators in Poultry Husbandry.

'86, B. S.—H. C. Chatfield-Taylor has changed his address from Lake Forest, Illinois, to Santa Barbara, California.



'91, Ex.—Jas. M. Drew, assistant to Professor Roberts while in the college, has been connected with the Minnesota School of Agriculture since 1893, and is at present an instructor in the extension department.

'98, M. S. A.—J. Edgar Higgins, as horticulturist at the Hawaiian Experiment Station, is now conducting investigations in tropical horticulture. For one year (1913-1914), he was professor of horticulture at the University of Porto Rico, and as such investigated horticultural conditions in Cuba and Florida.

'08, W. C.—R. C. Baynard is now situated on a general farm of 305 acres near Queentown, Maryland.

'08, Sp.—Arthur D. Hoose is at present working a general dairy farm near Boonville.

'10, B. S.—George G. Becker is state entomologist of Arkansas as well as instructor in the University of Arkansas.

'11, W. C.—R. E. Clark has been actively engaged in working a 200 acre farm in partnership with his father. Besides his purebred cattle and his fruit trees, he has installed on his farm a milking machine, a Delco-light system, and is planning to install an air pressure water system to be run by an electric motor.

'12, B. S.—H. B. Sweitzer has resigned from his position as assistant professor of bacteriology at Purdue University in order to accept a position with the Pure Food Department of the United States Government, and is now working directly under Mr. Hoover.

'12, M. S. A.—Alfred Atkisin, head of the agronomy department of Montana State College, has been appointed Food Commissioner of that state by Herbert C. Hoover.

'12, B. S.—A. M. Goodman writes to ask that his address be changed to Morristown, New Jersey, where he has taken up county work. Previously he was in

dairy extension work for the Federal Dairy Division.

'13, B. S.—Walter Wilkie, farm manager for the Gowanda State Hospital farm at Collins, has married Miss Stalley of Amsterdam.

'13, B. S.—On January 2, John S. Clark married Miss Alice Howlett of Hardwick, Massachusetts. They will be at home in Hardwick after February 1st.

'13, B. S.—George W. Kuchler, Jr., is working a 108 acre farm near La Grangeville. While he is farming chiefly in a general way, he is also developing an orchard and some hothouse vegetables.

'13, W. C.—Edward S. Parsons, who has managed the poultry department at Broad Brook Farm for the past five years, is now in charge of the poultry on the Westwood Farms, Mount Kisco. This is almost entirely given over to commercial poultry raising.

'14, B. S. A.—Simon Marcovitch, having resigned his instructorship in entomology at the Minnesota Agricultural College, has now complete charge of the department of biology of the National Farm School, Bucks County, Pennsylvania.

'15, B. S.—E. A. Piester is instructing in the department of landscape architecture in the Iowa State College at Ames, Iowa.

'15, B. S.—C. Elpung has become manager of a group of farms near Thereso, New York, the acreage of which totals over 500. Besides these 500 acres which are in tilth, he controls about 100 acres in woodlot. He also has over 100 head of cattle, several of them purebred Holstein-Friesians; and in addition to all this, he owns a tractor, two automobiles and other modern farm machinery.

(Continued on page 308)



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29 East Madison Street, Chicago

Rural Dramatic Extension

(Continued from page 271)

the line of original dramatic extension in this country, we have seen that most of the attempts have been didactic in only the narrow sense, thereby sacrificing the artistic universal appeal which alone is appropriate and, to turn against the propagandist his own pet word, "practical." Entering a broader field, many extension workers are failing of an opportunity to correspondingly broaden. They are dramatizing time-worn slogans into plays with morals.

Perhaps the extension worker is not to be blamed for the sugar-pill drama which he may be initiating. He got his idea, in all probability, from the tendency of the time which marked his initial efforts. Ibsen, a clever dramatist, started it all with *Ghosts*. It taught a "powerful moral lesson." Thereupon almost the entire "legitimate" drama of America became profitably "moral." This and the "success" thereof gave rise to the idea that any definite didactic appeal was the thing to frame your play around. That idea is already recognized as a dead one by the Jewish gentlemen of Broadway, but in the ranks of reformers it goes on forever. We have such literary dissertations as *The Story of the Soil* by Cyril G. Hopkins in which the hero and heroine look lovingly into each other's eyes and discuss superphosphates; we have *The Brown Mouse* by Herbert Quick, almost as bad a mixture of love and rural school-teaching; and now come the plays—*The Guide Post*, *Back to the Land*, and so on. Even *Uncle Tom's Cabin*, with all its crudities, possesses more of the universal than do the disguised textbooks of Hopkins and Quick, mentioned above.

His Model Wife, *My College Chum*, *The False Friend* and other such stuff of the mail-order play catalogue contain more of the universal and are more worth-while, dramatically, than weighty lectures in four acts by extension pedagogues. A hero and heroine who look soulfully into each others eyes and discuss superphosphates, carry convictions neither as hero and heroine nor as agri-

cultural lecturers. Therefore let the new rural playwright leave lecturing to powers already constituted, and seek to portray the universal in country life. There is need of this, for the sake of the drama itself and for the sake of its development as a truly educational force.

All which has been said presupposes the present necessity and future possibility of educational extension dissociated, if not disinterested, from affairs of the farming business. It assumes that in good time the agricultural college will attempt to educate all its people in much the same broadening spirit as now they attempt to educate their students in residence at the college. This will be done by work with human beings, intensive work, local work, but work inspired and directed by the extension idea.

It assumes that we build our own little civilization and that it be complete; it assumes that we have in us the beginnings of a rural community that will support its own dramatist, architect and poet—its artistic colony—as gladly as did Greece. In his remarkable play *Disraeli*, Louis Parker caricatures an English country gentleman who remarks quite casually that his laborers now have absolutely no acquaintance with even Ruskin, but "that all must be changed." So it must.

To extract the countryman from all-exacting toil is the first step, and this is economic. To help the farmer "find himself" in the free and better environment is the second step, and this is humanistic. The first step is being achieved thru science, the second by science and by aid of the rural humanities, interpretations which country people can find from their own environment and within themselves.

From its very nature, the Rural Drama will, by a process of trial and error, become part and parcel of the second process. Even in its present crude phase, it represents the first signs of development of rural art that has escaped schools and taken root among the folks. It is a great work to get into.

(Continued on page 282)

Once for All *IRON AGE*

Potato Machinery Answers the Farmers' Big Questions

Undoubtedly, the biggest question of all is: "How can I cut the cost of production?" Labor is scarce and more costly than ever before. Let Iron Age Potato Machinery come to your aid. They make the most of high-priced help and reduce production costs.

100% Potato Planter plants entirely by machine yet provides for correcting doubles and misses. It saves one to two bushels per acre—some say a barrel. And, it insures a perfect stand. With or without fertilizer attachment and with choice of furrow openers—two styles.

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Iron Age Potato Diggers reduce the cost of digging, especially when the Engine Digger is used. They get every tuber. The Engine Digger works readily in either sandy or heavy clay soil, or in soil choked with crab grass and green vines. Automatic throw-out-clutch prevents breakage. Iron Age Diggers may be had in four styles—one will serve your purpose.

Write today for booklets describing Iron Age Potato Machinery.

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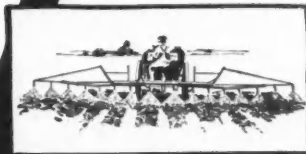


**100 PER CENT
POTATO PLANTER**
Never misses—Never doubles



**No. 78 Riding
Cultivator**

ENGINE SPRAYER
We also make four and six-row sprayers



ENGINE DIGGER
Digs faster—saves two horses



Rural Dramatic Extension

(Continued from page 280)

He who undertakes to extend such work ought to see to it that standards are kept high. He ought not be content with any plan that simply draws country people together and satisfies their social craving. "That is pretty, but is it Art?" Neither should he cling priggishly to Arts College ideas of Art,—Shakespeare for instance. They do well enough for a start, for want of a better, but the ultimate ideal is a native production of artistic worth, expressive of universal actions and reactions of those who live between sod and sky cooperating with the forces of eternity. The rural humanities are more real than those of dead ages. It is these which the rural drama must artistically interpret. The business of farming is the sum of many such humanities, and many more farm plays will be written, but not from the standpoint of money-making.

Book Reviews

The Joyous Art of Gardening, by Frances Duncan, formerly Garden editor of *The Ladies' Home Journal*. Published by Charles Scribner's Sons, New York City. Price \$1.75 net.

This book is for first aid to the amateur aesthetic gardener, combining principles of landscape art on small suburban properties with practical information as to the planting and care of flowers and shrubs. It is hardly a book for the busy farmer, but the exceptional farm wife, who yearns to have a yard in good taste or in the latest style, may find use for it. Country community improvement associations may also find the book stimulating and helpful to their work, especially those associations centered in country towns.

Text-book of Land Drainage, by Joseph A. Jeffery. The MacMillan Company, New York. 256 pages. \$1.25 net.

In the present era of agricultural development the causes for low crop yields are variously estimated. Bad management, over-cropping, loss of soil fertil-

ity, washing away of soils, "changing climatic conditions," and even "over-drainage" are among the more prominent of the causes named. The improper functioning of common soils, because of the extended presence at some time during each year of excessive amounts of water, is seldom mentioned. Mr. Jeffery, however, throws new light on the importance of this problem. These losses and the means of correcting them are the theme of this text.

Manual of Milk Products, by William A. Stocking, professor of Dairy Industry at Cornell University. Published by the MacMillan Company, New York, as one of the Rural Manuals. Price \$1.50.

In this book Professor Stocking has attempted to condense the literature on dairy subjects into a book suitable for use as a reference work on milk and its products. It is, therefore largely made up of quotations for which credit is given in each case. The book takes up in detail the physiology of the production of milk, its chemistry, and its physical properties before taking up the commercial products, testing, bacteriology and the marketing of milk. It is one of great value to a practical farmer, filling a long felt need of a work which would thoroly cover the field of commercial dairying.

Western Live-stock Management, by Ermine L. Potter, professor of Animal Husbandry at the Oregon Agricultural College. Published by The MacMillan Co., New York. Price \$1.75.

A statement of livestock management as it is, advocating no new or untried systems, this book has been formed from notes and circulars as a text and reference book for beginners in the business. It does not contain any facts which the older and more experienced men do not already possess. The problems and the four great branches of western livestock are taken up,—including beef cattle, sheep, horses and swine. The book covers in detail the

(Continued on page 284)



Purina Chicken Chowder brings chicks up twice as fast as a grain ration, because it is rich in the elements that make blood, bones, nerves, flesh and feathers. Grain provides, to a large extent, heat and energy, while

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together form the balanced ration which supplies all the chick's with the necessary nutrients in proper proportion to produce rapid all around growth.

New Feeding System

Professor W. R. Graham of the Ontario Agricultural College, Guelph, Ontario, has found that better results with baby chicks are obtained when damp mash is fed five times a day for the first week with no grain feed whatever. This system has been perfected with PURINA CHICKEN CHOWDER and PURINA CHICK FEED. Let us send you full full information.

RALSTON PURINA MILLS
St. Louis, Mo. Buffalo, N. Y.



Book Reviews

(Continued from page 282)

breeding, feeding, fattening, branding and marketing of each of these as it applies to western conditions.

Bush Fruits, by Fred W. Card. Published by the MacMillan Co., New York. Price \$1.75.

This is a new and revised edition of Professor Card's book. Professor Card has become, since the last revision, a real farmer, and understands the growing of fruit from both the theoretical and practical standpoints. The book has long been a standard in its field and this new revision brings it thoroly up to date. The chapters on diseases and on insects were prepared by specialists on those subjects; the latest methods of handling and marketing berries are described, and various methods of growing each berry are taken up in detail. In addition to several small fruits, the currants, raspberries, dew berries, and blueberries are taken up in turn.

Around the Year in the Garden, by Frederick Frye Rockwell. Published by the MacMillan Company, New York. Price \$1.75.

This book is designed for the busy man or woman whose spare time for gardening is limited and who is consequently interested in utilizing every hour to the best advantage. There is written a chapter for every week in the year, and these contain directions and advice which are seasonable at that time of year. The dates are rather general and meant more to call attention to things that are important then. Complete directions for every operation necessary in gardening are given and attention called to the most efficient way of accomplishing them. There are also directions and a guide to the proper use of a greenhouse. The book

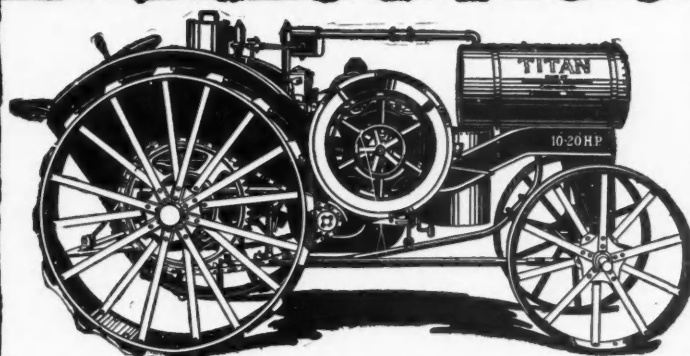
is liberally illustrated, largely from the author's own garden.

Farm Concrete, by K. J. T. Kerblaw, Associate Member American Society of Agricultural Engineers. Published by The MacMillan Co., New York. Price \$1.60.

A simple, non-technical, and comprehensive work on all phases of concrete which relate to farm structures. It is a book in which the author has successfully brought together all the mass of material that has been written on this subject so that it may be efficiently used. It gives definite instructions for all the known uses of concrete and working plans for the more common structures. The reasons why cement may not have proven a first-class building material in the past are explained and remedies are given. With the use of this book it ought to be possible for anyone of some experience in mixing concrete to successfully use his own labor on the more common structures.

The Nutrition of Farm Animals, by Henry Prentiss Armsby, Director of the Institute of Animal Nutrition of the Pennsylvania State College; expert in animal nutrition, United States Department of Agriculture. Published by MacMillan Co., New York. Price \$2.60.

This book on nutrition is by a very well-known authority on the subject and is one which thoroly covers every phase of it. It is a book intended for a student and would be rather difficult for a person of common education to read intelligently. It opens, logically, with the elementary chemistry of plants and animals and feeding stuffs and further takes up the vital processes of animal life, the uses of foods and its value as well as the methods of finding out these things. The latter two parts of the book relate to feed requirements and the values and computation of rations. The book is sparingly but exceptionally well illustrated.



Buy Your Tractor Now

THE tractor is a real help to American farmers now. It is fast taking over all the heavy farm power work.

Kerosene is the best, as it certainly is the cheapest tractor fuel. Therefore all our tractors, **International**, **Mogul** and **Titan**, are designed, built, and guaranteed to operate successfully on this cheap, plentiful fuel.

We pay particular attention to these three essential features: That our tractors shall operate on the cheapest fuel farmers can buy; that they shall be so simple that any farmer can learn to handle them; and that they shall do enough good work in the field and at the belt to more than pay for themselves.

On this basis we solicit your orders for **Mogul 10-20**, **Titan 10-20** and **International 15-30** kerosene tractors.

It will be difficult for us to furnish your tractor as soon as you want it. The demand is hard to keep up with and shipping facilities are very much handicapped. Send for our catalogues now, make your decision, and send in your order as soon as you can. Invest in an International Harvester guaranteed kerosene tractor in time for the spring plowing.

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CHICAGO

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Tell Advertisers Who Introduced You



It never was good business to let chicks die. Now it's bad business and bad patriotism, too. For every fowl is needed to help out in the present food scarcity.

Yes, we can tell you a good way to raise more chicks to maturity.

"Feed H-O Steam-Cooked Chick Feed until the chicks are at least 6 weeks old."

See if our exclusive steam-cooking process does not actually make this feed easier to digest because it dextrinizes part of the grain-starches. Notice that you never find any sour or musty grain in H-O Steam-Cooked Chick Feed. That's because the same steam-cooking process reduces the moisture content of the grains.

Samples and descriptive folder on request

THE H-O COMPANY

Feed Dept., Buffalo, N. Y.

Members U. S. Food Administration

J. J. CAMPBELL, Eastern Sales Agent
Hartford, Conn.

Built Right

in material and construction. No weight for team to carry. You get perfect results and long wear with a

Cutaway Single Action **(CLARK)** Disk Harrow

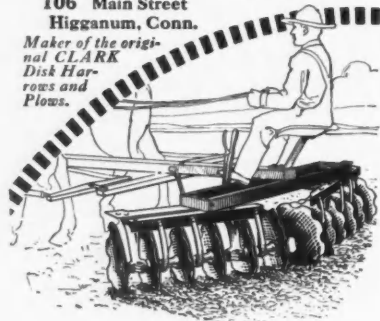
Disks are forged sharp; has reversible gangs, separate levers, dust-proof oil-soaked hardwood bearings. Sizes for one to four horses. Also with extension head. Weight boxes built in. No tongue truck necessary. Perfect balance, light draft.

Write for new catalog and free book "The Soil and Its Tillage;" also for name of nearest dealer.

The Cutaway Harrow Company

106 Main Street
Higganum, Conn.

Maker of the original CLARK
Disk Harrows and
Plows.



How Should I Market My Fruit?

(Continued from page 265)

is to be shipped, a number of matters should be taken into consideration, such as, freight and express rates; the time that it takes for freight and express to arrive and the consequent necessity, or lack of it, for refrigerating; the chances of delay in shipping over two or more different roads, and the charges of the commission men at the different points for cartage, refrigerating, and the like. In regard to the last point, some commission men charge no cartage on freight, while others charge as high as four cents for a half-bushel basket. Some commission men in the smaller cities will ice a car of peaches on its arrival, so that the fruit will keep for a week or more until it is sold out, and charge the expense of icing to the shipper; of course this is an advantage, if the shipper gets enough more for the fruit, by holding, to warrant it. In general, it may be said that it is better to ship to the larger cities in the years when there is a short crop, and to the smaller places when the crop is abundant; because the larger places will pay higher prices when fruit is scarce, and when fruit is plentiful the smaller places are less likely to be overstocked.

In many cases the two general ideals of marketing fruit—that of selling direct and that of selling to buyers or commission men—are combined to good advantage. A certain number of retailers may be supplied regularly with what fruit they can use, and the balance may be sold to buyers or shipped to commission men. This has the advantage of furnishing a fairly constant supply to the retail trade, without crowding on it the excess of fruit that ripens during a few hot days or the excess of a very large crop.

Each year, as it comes, brings with it some new conditions to be met. The weather is never twice the same, the fruit crop varies both in size and in quality, and market conditions are con-

(Continued on page 288)

BURPEE'S SEEDS GROW

The Department of Agriculture estimates the value of back-yard gardens of 1917 at more than 350,000,000 of dollars. At least, 100,000,000 dollars have been added to the nation's wealth by the increased planting of 1917.

It is even more necessary to take care of the future. Demonstration gardens in many big cities planted with Burpee's Seeds have done their share to instruct the amateur gardeners. Burpee's Seeds have a forty year reputation for the Best that Science can produce.

BURPEE'S ANNUAL FOR 1918

has been greatly enlarged and improved in order that it may be of the greatest help to every gardener. It has 216 pages, 24 of which are in color illustrating more than 100 varieties of choice vegetables and flowers. Always a safe guide to success in the garden. Mailed free upon request. A post card will bring it. Write for it today and mention Cornell Countryman.

Seed Growers

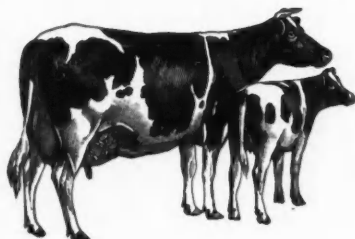
W. ATLEE BURPEE CO.

Philadelphia

THE MORE YOU LEARN ABOUT COWS
THE MORE YOU APPRECIATE

PURE
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HOLSTEIN COWS



The most efficient milk making machine in the world. All records for both milk and butterfat production are held by this—the profitable breed.

Write for free illustrated booklets

The Holstein-Friesian Association of America

Box 196, Brattleboro, Vt.

Say Where You Saw It When You Write

Guernseys



QUALITY
DISTINGUISHES GUERNSEY PRODUCTS

The highest Natural Golden Yellow color, delicious individual flavor, and high content of butter fat—combine to make Guernsey milk in greatest demand by discriminating consumers.

Write for information relative to Guernseys, to
AMERICAN GUERNSEY CATTLE CLUB
Box Y Peterboro, New Hampshire

Nitrate of Soda

Data as to increased crop yields due to the use of Nitrate are available. Why not make your business of crop fertilizing profitable by the use of Nitrate of Soda whose efficiency is known?

A bushel of corn or wheat or a bale of cotton today will buy more Nitrate and more Acid Phosphate than ever before.

Send for "Increased Crop Yields from the use of Nitrate of Soda"

Dr. WM. S. MYERS, Director
Chilean Nitrate Committee
25 Madison Avenue, New York

Say Where You Saw It When You Write

How Should I Market My Fruit?

(Continued from page 286)

tinually fluctuating. The most peculiar season was that of 1913 during which the marketing of the peaches and apples were affected by the existing conditions. There was an excess of rainfall and less than the normal amount of sunshine, producing a crop of peaches inferior in quality and too juicy to carry well, and also the largest crop of peaches ever produced in the country. Here satisfactory marketing was an easy problem. The exceedingly large southern crop was so thoroly distributed thru-out central and southern New York that every little town and hamlet had its carload of peaches, and this at a price which must have netted the grower almost nothing after freight, icing, and selling expenses were paid. Naturally the people bought peaches freely, and, as the northern crop was reported short, did a lot of their canning and preserving, which is usually left until the home fruit comes.

During the height of this season, the first varieties of the northern crop of peaches began to ripen. These peaches are mostly inferior in quality, white-fleshed, and unsatisfactory for shipping. Ordinarily they have a ready sale at fair prices because the market is comparatively bare and the first home-grown fruit is looked for. But in this year they came in competition with the very best yellow fruit from the Jersey and Delaware regions, and as most persons prefer yellow peaches to white, and as the yellow fruit was selling very low, the white fruit was hard to sell at all. Several new plans were tried. The fruit was sorted more closely for imperfections and for ripeness, the overripe peaches being sold at the packing house for whatever they would bring. A fruit grader was used which materially lessened the cost of packing and sized the fruit accurately. The smaller sizes were not put on the market at all. Several carloads were sent to neighboring towns in charge of a man who by advertising

(Continued on page 290)



WITH DRIED BUTTERMILK --for More Hog Profits

It pays well to minister to nutritional needs of the sow, because in doing so she will not only lose less weight, but her pigs will grow faster, be more healthy and thus make more profitable pork.

Sow's milk contains practically 72% more protein (muscle and bone builders) 82% more fat and 43% more of that precious calcium, phosphorus and other mineral ash which largely comprises the dry minerals of bone, than the milk from ordinary cows.

Is it any wonder that the sows get thin, even though they are well fed, producing through their mammary (milk-secreting) glands such a rich concentrated food?

PIONEER HOG FEED ---with Buttermilk

produces energy and is the foremost balanced ration possible to obtain for Profitable Hog Production. All the proteins of Buttermilk are especially efficient as they contain all the proteins of the Animal Body.

Corn alone is lacking in protein—and BUTTERMILK assists the various food values in PIONEER HOG FEED to supply the deficiencies of the proteins as fed in corn and other cereal grains. We obtain about ten pounds of dried Buttermilk from every hundred pounds in liquid form.

PIONEER HOG FEED WITH BUTTERMILK is made from Wheat Middlings, Corn Feed Meal, Linseed Oil Meal, Ground and Bolted Wheat, Barley and Kafir Screenings and Dried Buttermilk. The Guaranteed Analysis is as follows: Protein 12%, Fat 3%, Crude Fibre 12% and Carbohydrates 60%.

Hales & Edwards Co.
Authorized Manufacturers Dairymen's League Dairy Feed
WEBSTER BUILDING, CHICAGO

Tell Advertisers Who Introduced You

Nutritive Requirement of Hens---Whole or Cracked Grains vs. Tioga Laying Food

Laying Hens require nourishment for two distinct purposes, equal in importance; one to maintain strong healthy bodies free from surplus fat, the other to furnish the material for eggs.

This two fold demand requires feed containing 15% Digestible Protein, 60 therms of heat and energy food and 6% mineral matter.

Whole and Cracked Grains average 8% Digestible Protein, 83 therms heat and energy food and 2% mineral matter; a surplus of 23 therms heat and energy food which produces surplus fat and only about one-half the protein and one-third the mineral matter required.

Tioga Laying Food contains 15% Digestible Protein, 60 therms heat and energy food and 6% mineral matter, the exact requirement of laying hens in easily digestible form free from surplus fat and fibre both of which are injurious.

Since the foregoing was written this standard of nutrition for Poultry has been adopted by the Pennsylvania Poultry Association and the Pennsylvania War Poultry Commission.

**Tioga Mill & Elevator
Company**

Waverly,

N. Y.

How Should I Market My Fruit?

(Continued from page 288)

a day or two ahead sold the fruit out directly from the car. One of these cars had to be changed from one place to another before it could be all sold out, because a carload of peaches had been sold the day before on the advertising intended for the second car, and the place was not large enough to handle two cars so near together. All these things helped, and helped very materially, in marketing the crop, and yet the prices obtained did not very much more than pay for the cost of handling.

As the season advanced and the better varieties of peaches ripened, the prices did not go up, as had been expected, but remained about the same. Of course, consumption was greater. People who were in the habit of buying peaches for one meal at a time would buy a half bushel and keep them until used. But any attempt to advance the price was met by decreased consumption until the price went down again.

The new State Department of Foods and Markets was also tried. Evidently, however, the Department had not yet the hold on the peach situation that it had on the apple, for peaches sent to the commission market at the same time considerably outsold those sent to the Department. This was largely made up, however, by the smaller price for commission and handling charged by the Department, so that the net difference was not great.

The apple situation for the next year presented a more cheerful picture, especially for those who had apples to sell. The crop, while not particularly short, was below the normal, and the demand was good. The State Department of Foods and Markets by its auction system helped to advertise New York State apples, and helped the growers to pack in accordance with the new state law. It also helped greatly in establishing a fair price between the grower and

(Continued on page 292)

TREMAN, KING & CO.

More Poultry - More Eggs - More Money

**CORNELL GASOLINE
BROODER HEATER
and POULTRY HOUSE
APPLIANCES :: :: ::**

No poultryman can afford to be without these twentieth century
appliances. Write for information or stop in our store and learn why

Mfgs. of Poultry House Appliances

This Tag on Every Bag

**Fancy Recleaned
SEED OATS**

FROM

Tioga Mill & Elevator Co.
Waverly New York

These are *Selected Stock* from which false oats, light oats and pin oats have been removed, leaving only the best heavy oats.

If you plant oats to raise oats and get the largest returns for your work and investment, it will pay you to plant only seed that will grow and produce strong plants. False and light oats will not grow. Good oats with strong germinating qualities insure larger returns.

FRONT

BACK

Sowing Selected Oats Pays Big!

In thorough germination—in bigger crops. Our seeds are sold in their natural state or treated for smut by approved government method. The Department of Agriculture and Farm Bureau Agencies strongly recommend planting treated oats as it insures increased production with no added expense aside from the slight difference in cost.

If "treated" it will say so on the tag.

Tioga Mill & Elevator Co.

Waverly, N. Y.

Buy Trees Direct

We cut out the Agents and give you **Big Discount** from Agents' Prices. You save almost half the ordinary cost. All our stock, including hedgings, roses, fruit and ornamental trees, shrubs and small fruit trees, is healthy, productive and fully pedigreed. You take no transportation chances, because we guarantee delivery in perfect condition and pay all freight or express charges to your station. Not a single dissatisfied customer last year.

This Pear is a Sure Profit-Puller

Known as the Beurre Bosc or Thanksgiving Pear, and proves to be a sure buy. When cold-stored until the holiday season, this variety frequently sells as high as \$8.50 a barrel.

Write today for **FREE** book that's chock-full of helpful information.

WM. F. RUPERT & SON,
Box 34, Seneca, N. Y.



BOOK BINDERY

Have your
Countryman
bound

We bind theses, notes, etc.

J. WILL TREE

118 N. Tioga St.

ITHACA, N. Y.

How Should I Market My Fruit?

(Continued from page 290)

the buyer. Even in some of the auction sales thru the State where no fruit was sold, the advertising given to the region and the new buyers attracted were a distinct advantage.

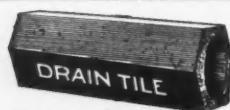
However, it is not hard to sell anything that is in demand. So the selling of the apple crop did not present the difficulties that it might have presented if there had been a big crop. The year's experience with the two crops, apples and peaches, points out very clearly the advantages of diversification—advantages that are just as important to the fruit grower as to the general farmer.

The Why of the "June Drop" of Fruit

(Continued from page 268)

relatively few fruits are set. Such conditions are unfavorable for pollination and fertilization because the insects cannot work effectively, and the anthers and stigma may be so injured that the pollen produced cannot germinate normally. Furthermore, the translocation of stored food and other physiological processes are inhibited by low temperatures and this would probably have a detrimental effect on the nutrition of the flower and newly set fruit. Such diseases as scab do considerable damage during the cool, rainy days which favor

(Continued on page 294)



USE NATCO DRAIN TILE

Farm drainage demands durable tile. Our drain tile are made of best Ohio clay, thoroughly hard burned—everlasting. Don't have to dig 'em up to be replaced every few years. Write for prices. Sold in carload lots. Also manufacturers of the famous **NATCO IMPERISHABLE SILO**, Natco Building Tile and Natco Sewer Pipe.

National Fire Proofing Company - 1136 Fulton Building, Pittsburgh, Pa.



Apollo

Roofing Products

Metal makes the most satisfactory roofing for farm buildings or city construction.

APOLLO-KEYSTONE Copper Steel Galvanized Sheets are unequalled for Culverts, Tanks, Silos, Roofing, Spouting and all exposed sheet metal work. Look for the Keystone added to brand. Sold by leading dealers. KEYSTONE COPPER STEEL is also superior for Roofing Tin Plates. Send for "Better Buildings" booklet. **AMERICAN SHEET AND TIN PLATE COMPANY, Pittsburgh, Pa.**



Say Where You Saw It When You Write

Hook Up a "High Speed" Sprayer With Your Farm Engine

Has direct connection with engine shaft—no troublesome gears. Operates at the full speed of engine—from 450 to 550 strokes per minute. Maintains very high pressure—250 lbs.—enabling you to cover every inch of bark with a fine misty spray. The capacity—6 gals. per minute—makes it easy to spray a big orchard on time. Vacuum and air chambers insure steady flow of liquid. For real sprayer satisfaction, use

GOULDS SPRAYERS HAND AND POWER

—50 styles. Our Service Department will guarantee every one to perform satisfactorily the work for which recommended. All rigidly tested and backed by 69 years' pump-making experience. "We also make a complete line of Power, Windmill and Hand Pumps for water supply and other services.

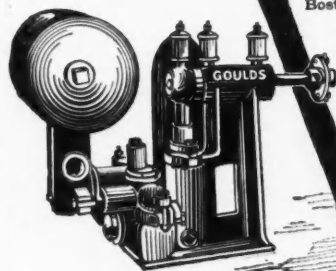
You need our free book, "Hand and Power Sprayers." Contains information of great value to every fruit grower. Write us today for your copy. Address Dept 38.

The Goulds Mfg. Co.

Main Office and Works:
Seneca Falls, N. Y.

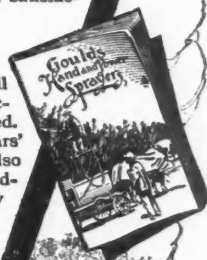
Branches:

Boston New York
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Goulds Fig. 1662

"High Speed" Power Sprayer
—operates at speed of engine
—no gear reduction whatever.



Tell Advertisers Who Introduced You



Free!

A 50-gallon barrel of Scalecide free to any one who will suggest a *fairer* guarantee than that given below.

"SCALECIDE"

As proof of our confidence and to strengthen yours, we will make the following proposition to any fruit grower of average honesty and veracity: Divide your orchard in half, no matter how large or small. Spray one-half with "SCALECIDE", and the other with Lime-Sulfur for three years, everything else being equal. If at the end of that time, three disinterested fruit growers say that the part sprayed with "SCALECIDE" is not in every way better than that sprayed with Lime-Sulfur, we will return you the money you paid us for the "SCALECIDE".

Send for new free booklet, "Profits in Fall Spraying".

B. G. Pratt Co., Mfg Chemists
50 Church St. Dept. 30 New York

Good Farm Help

The farm hands you hire must prove their worth. When you buy rope and binder twine (other important farm helps) you can be absolutely sure of quality and worth *before you buy* if you insist upon getting

COLUMBIAN Rope and Binder Twine

They always make good; they do their work in a way that will always satisfy you.—like good farm hands, COLUMBIAN Rope and Binder Twine are strong and sturdy and fully capable of doing the work for which they are required, because they are made of selected long, tough fibres.

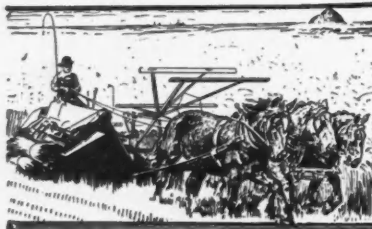
For your hayfork or anywhere around the farm use COLUMBIAN Rope.

For better and faster work with your binder use COLUMBIAN Binder Twine.

Send for our interesting war story:—"The Adventures of a Bale of Hemp."

COLUMBIAN ROPE COMPANY

140-70 Genesee Street, Auburn, N. Y.
Branches: New York Chicago Boston



Say Where You Saw It When You Write

The Why of the "June Drop" of Fruit

(Continued from page 292)

their development. Frequently the trees cannot be effectively sprayed during such weather.

When orchards are unsprayed, the scab and codling moth cause a great-

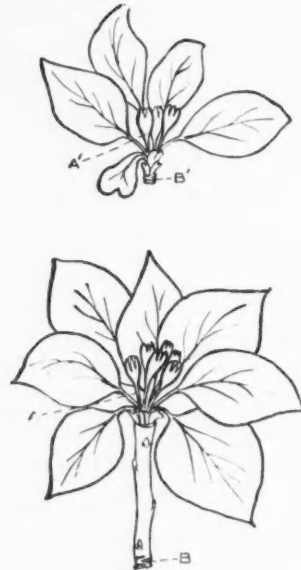
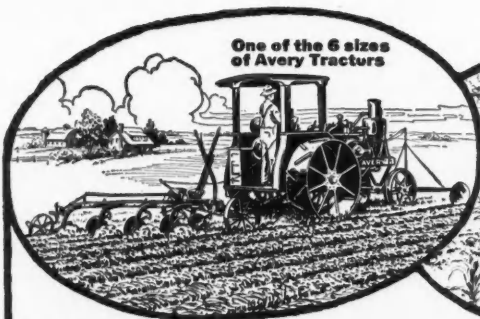


FIG. 3. LEAVES AND FLOWERS ON SPURS OF DIFFERENT VIGOR

Lower figure, a typical vigorous spur of the variety Tompkins King; upper figure, a spur below medium in vigor of the same variety. The spurs were obtained just before the flower buds opened. The number of flowers (A, A'), the number and size of the leaves, and the length of the preceding year's spur growth (B, B') may be compared. ($\frac{1}{2}$ natural size)

er increase of the "June drop." Many flowers and fruits may be lost, too, as a result of winter injury. The flowers may appear normal when they open, but the essential parts—the

(Continued on page 296)



Averyize Your Farm Work

There isn't any question any more about the success of tractor farming—the only question now is—which is the best tractor for you to get.

When you **Averyize** your farm you can be sure you have made a wise selection. When you get an Avery you are getting a tractor that is long past the experimental stage. It has been put to every test known.

We proved our faith in Avery design by introducing Avery Tractors on a sold-on-approval policy. We have proved the success of the Avery design by entering it in every important motor contest and demonstration held in this or any other country. And the strongest proof of the success of Avery design is that men who bought the

first Avery Tractors years ago are buying more Avery Tractors—sons, brothers, cousins, and neighbors who have watched Avery work are buying in large numbers.

Avery Tractors are built by a company having over thirty years' experience in building power farming machinery, with tens of thousands of Avery machines in operation all over the world, and by a company owning a large factory with branch houses and distributors covering every State in the Union and over 60 foreign countries.

A Size for Every Size Farm and Every Kind of Work

There are six sizes of Avery Tractors from which you can pick exactly the right size tractor for your work. There's an Avery Two-Row Motor Cultivator for doing your cultivating and other light traction and belt work. Plants and cultivates any crop, such as corn, beans, cotton, etc., also handy for harrowing, drilling, hay cutting, hay raking, feed grinding, pumping, sawing, and other work.

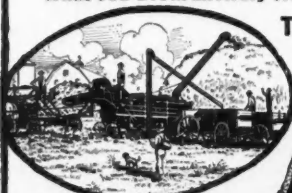
Then you can get an Avery Plow and an Avery Thresher to fit any size tractor, and you have an equipment of Tractor Farming Machinery that will enable you to raise a larger crop at less expense and save it after you raise it.

What You Get in an Avery Tractor. The five

sizes of Avery Tractors—8-16, 12-25, 18-36, 25-50 and 40-80 h. p., are all built of the same design. Also a 5-10 h. p. Tractor, especially for small farms and lighter work on large farms.

Avery Tractors are the only tractors with a double carburetor and duplex gasifier that burns ALL the kerosene. They have a patented sliding frame that eliminates the intermediate gear used on other tractors. Saves expense and increases the power. They are the only tractors with renewable inner cylinder walls, crankshafts one-half or more in diameter than the diameter of the cylinders, adjustable crankshaft boxes, no fan, fan belt, governor belt, fuel pump or water pump.

Light and Heavy Plows and Threshers. You can get an Avery Tractor Plow either light or heavy, in any size from 1 to 10 bottoms, and an Avery Thresher in any size from a small 19x30 inch up to a large 42x70 inch.



Get a Guaranteed Avery Grain Saver Thresher in any size, 19x30 inch up to a large 42x70 inch.

The 1918 Avery Motor Power Book is Ready for You

It shows all Avery machines in their natural colors, both stationary and actual working scenes. It has unusual detailed illustrations of tractor construction. Write for free copy and ask for special information about the size machines you need. Address

AVERY COMPANY, 4705 Iowa St., Peoria, Ill.

Branch Houses and Distributors Covering Every State in the Union and More Than 60 Foreign Countries

AVERY



There's a size Avery Tractor for every size farm and every kind of work.

The Value

of a material depends upon its qualities and the service it renders.

Those who have investigated, tested and compared the properties contained in the different dairy cleaners in an effort to conserve, now use

Wyandotte
dairyman's
Cleaner and Cleanser

And why? Because they find the results produced by the use of this cleaner show a most favorable contrast to those obtained when ordinary cleaners are used—that their cleaning problems are solved in the most efficient and economical way by its use—that its thorough cleansing and ready rinsing nature not only save them time and labor, but also give them the greatest amount of protection to their milk quality.

But why not give this cleaner a trial, and know because of your own experience how much assistance it can give you? You can lose nothing by giving it this trial, for every order is guaranteed to prove these claims, or cost you nothing.

Order from your supply house.

IT CLEANS CLEAN

Indian in Circle



in every package

The J. B. Ford Co., Sole Mnfrs.

Wyandotte, Mich.

The Why of the "June Drop" of Fruit

(Continued from page 294)

stamens or pistil—may be injured and thus prevent their proper development. Late spring frosts are, of course, damaging in some years as are also hail and strong wind storms.

The set of fruit, then, is dependent on two general conditions: (1) favorable conditions of nutrition and water supply

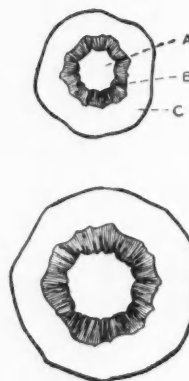


FIG. 4. CONDUCTING CYLINDERS IN SPURS OF DIFFERENT VIGOR

Cross section of a vigorous spur, below, and of a moderately vigorous spur above. A, pith; B, xylem (conducting tissue); C, cortex. The section was obtained just above the ring of scars. Outline from camera lucida drawing. $\times 6$

and (2) upon the absence of destructive agents such as diseases, insects, frosts and the like. When we consider that the flowers and fruits are subject to so many unfavorable conditions, we are not so much surprised that less than ten per cent of the flowers set fruit, but that even these should escape destruction. Nevertheless, the large number of flowers originally produced can under normal conditions offset these destructive agencies.

Say Where You Saw It When You Write

SEED CORN

For the first time since we went into the business, we are worried because we fear that our stock of seed corn is too small for this year's requirements. It was not our fault, because we had out a very large acreage but premature frosts and hard freezes eliminated large blocks that were meant for seed. We have a moderate supply of very choice quality. Corn that will germinate ninety-eight per cent. This corn is all pedigreed, includes our famous Improved White Cap and 120 Day Yellow, both of which have taken a prominent part in Ohio, and winning state contests; also limited stock of Minnesota 13, the best very early corn, we believe, that has ever been introduced into the state.

Do not forget that we also handle the best of everything in vegetables, flower seeds, plants, bulbs, etc.

WING SEED COMPANY

Box W

Mechanicsburg, Ohio

Cow Comfort in Zero Weather

You can hold your cows to full milk flow during a cold snap—if they are housed in Natco Barns and fed from a Natco Silo. The dead-air spaces in the hollow tile walls keep out the cold yet prevent dampness and frost from gathering.

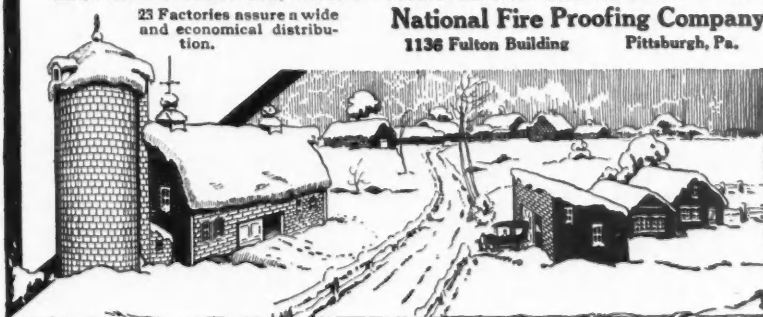
Natco Hollow Tile

buildings save painting—will not rot, crack or crumble. Will not harbor rats, mice or other vermin. The glazed dust-tight walls make it easy to produce clean milk. Natco Hollow Tile is widely used in fire-proofing "skyscrapers"—let the same material safeguard your stock and reduce your fire-risk.

Your building supply dealer will gladly show you samples of Natco Hollow Tile and quote prices. Also, write us at once for new, illustrated "Natco on the Farm" book—1918 Edition. It's free!

23 Factories assure a wide and economical distribution.

National Fire Proofing Company
1136 Fulton Building Pittsburgh, Pa.



Tell Advertisers Who Introduced You

THE SUCCESS OF THE

Trade Mark

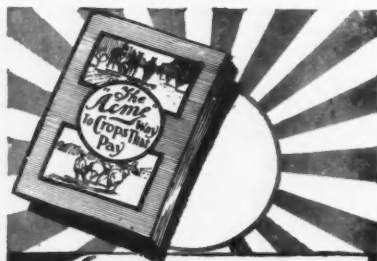
Registered



BRAND OF BEEF CRACKLINGS

is due to its WHOLESOMENESS
and DIGESTIBILITY

THE FLAVELL CO.
ASBURY PARK, N. J.



"The 'Acme' Way to Crops That Pay"

is the title of our free book that points the way to increased yields. Shows how to secure deep, firm, moist seed beds without waste of time or labor. Fully describes the "Acme" Tillage Line and explains "Why the Coulters Do the Work" in field, orchard and garden better than it can be done in any other way. Gives the findings of State Experiment Stations in every part of the country.

This book will help you to grow bigger crops. Send a postal today.

DUANE H. NASH Inc.
120 Elm St., Millington, N. J.

Receipts for Wheat Saving Breads

(Continued from page 278)

Rice Bread

8 cups flour,
1 cup rice, uncooked,
2 tablespoons corn syrup,
5 teaspoons salt,
2 cakes compressed yeast,
5 cups water.

Corn Bread

8 cups flour,
1½ cups cornmeal,
5 teaspoons salt,
2 tablespoons corn syrup,
2 cakes compressed yeast,
5 cups water.

Bread Crumb Bread

8 cups flour,
4 cups bread crumbs,
2 tablespoons molasses,
5 teaspoons salt,
2 cakes compressed yeast,
4 cups water, or milk and water.

White Bread (Basic recipe)

13 cups flour,
2 tablespoons corn syrup,
5 teaspoons salt,
2 cakes compressed yeast,
1 quart water.

Directions for making yeast breads.

1. To prepare the substitute:

Soak beans or barley overnight, drain off the water, measure it, and add sufficient water to make 1 quart. Cook the beans or barley in this until they are soft.

Cook the cereal or potato in 1 quart of water until it is soft, and use any liquid that has not evaporated in the cooking.

Mash the potato.

Grind the bread in a chopper; add 3 cups of lukewarm water.

2. Combine the hot mush or mashed potato with the salt and the sweetening, stirring the mixture often enough to avoid the formation of any film, until it has cooled to blood heat.

(Continued on page 300)

Say Where You Saw It When You Write

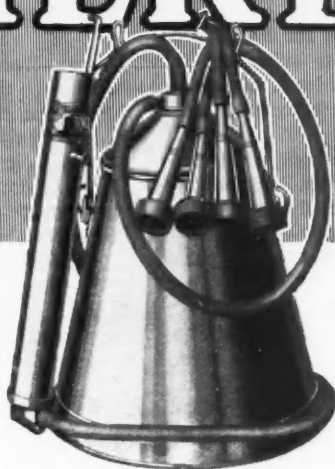
THE NEW HINMAN MILKER

over
31,000
sold

10 years
success

"100% better satisfied than expected. Instead of milk production falling off after installation, I find it increased."

WM. A. JONES,
Owatonna, Minn.



Milks the
Same
day in and
day out

The Individual Pump, Valve Chamber Milker

The New HINMAN MILKER has become the recognized standard of perfection and efficiency thru 10 years of concentration on this ONE TYPE of milker.

Study Specifications

CAPACITY: 1 man—3 milkers—18 to 25 cows per hour.
WEIGHT: 17 lbs.
POWER REQUIRED: 1/6 H. P. per single unit, gas or electric.
PAIL CAPACITY: 40 lbs.
PROTECTED VACUUM VALVE CHAMBER: Patented.
AUTOMATIC VALVE CHAMBER: operates with no adjustments.
DEMOUNTABLE CLAW: seamless teat cups, improved mouthpiece rubbers, special grade rubber tubing.
INDIVIDUAL PORTABLE PUMP: eliminates tank and pipe system.
ARMCO RUST RESISTING PAIR: with patented bail rest for teat cups.
Individual Cow Record can be kept.

This New Catalog is Ready

Write today, read the experiences of prominent and expert dairymen in all leading dairy sections. Investigate NOW.

HINMAN MILKING MACHINE CO.

104-14 Elizabeth Street

ONEIDA, N. Y.

Some good territory open for live agents.



Receipts for Wheat Saving Breads

(Continued from page 298)

3. When it is lukewarm, add the yeast which has been softened in 1 cup of water. If the bread is set overnight, reduce the yeast one-half and increase the salt one-fourth.

4. Add the flour, and knead the dough thoroly, using as little flour on the board as possible.

5. Let the dough rise for 3½ hours, or until it has doubled in bulk.

6. Work it down, and let it rise again for 1½ hours, or until it has increased its size by one-half.

7. Mold it, place it in pans, and let it rise until it has almost doubled in bulk.

8. Bake the loaves for 50 to 60 minutes in a moderately hot oven.

9. Remove the bread from the pans at once, and cool it quickly.

On account of the reduced amount of gluten in these breads, they must be molded and handled with great care. Gluten is the substance in wheat which gives wheat bread its superior elasticity. It is either absent from other cereals or occurs in small amounts or is of poor quality.

STEAMED BREADS**Everybody's Brown Bread**

(without fat or sugar)

- 1 cup cornmeal,
- ½ cup rolled oats,
- ½ cup dry bread crumbs,
- 1½ teaspoons salt,
- 1 cup sour milk,
- ¼ cup molasses,

1 teaspoon soda,

½ cup nuts or raisins, if desired.

Combine the first four ingredients. Mix the soda, the sour milk, and the molasses, and combine this mixture with the dry ingredients. Add the nuts or raisins last. Fill greased cans one-half full. Steam the bread for 3 hours or longer, and then set it in the oven to dry for 15 minutes.

Brown Bread

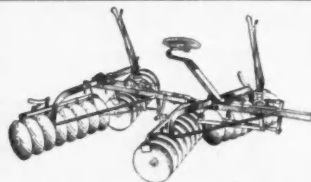
- 1 cup cornmeal,
- 1 cup rye flour,
- ½ teaspoon soda,
- 2 teaspoons baking powder,
- 1 teaspoon salt,
- 1/3 cup molasses,
- 1 cup sour milk,
- 1 or 2 tablespoons melted fat,
- ½ cup raisins.

Sift the dry ingredients together; add the liquids and the raisins, and turn the mixture into greased molds. Steam the bread for 1½ hours.

Rollled Oats Bread

- 1 cup rolled oats,
- 1 cup cornmeal,
- 4 teaspoons baking powder,
- 1 teaspoon salt,
- 2 tablespoons syrup or molasses,
- 1 cup milk,
- 1 egg,
- 1 or 2 tablespoons fat.

Mix the ingredients in the order in which they are given. Turn the mixture into greased molds, and steam it for 1½ hours.

**Bissell Double Action Harrows**

will thoroughly cultivate and pulverize any soil. One Harrow is Out Throw; the other is In Throw. They are simply constructed, rigid and durable. The gangs are flexible and the Disk Plates are so designed that they "hang" right into the soil. Bissell Har-

rows are built in sizes and weights suitable for horse or tractor use.

Examine the Bissell Reversible and Extension Disk Harrows for Orchard and Vineyard work. All Bissell Disks are sold on trial against anything built for cultivating.

Manufactured by T. E. BISSELL CO., Ltd.

Elora, Canada

Address McADAM & SONS, Barker, N. Y.

General Agents

**Save Your Corn---Feed Buffalo Corn
Gluten Feed with Your Home Grown Roughage or
with Carbohydrate Commercial Feed to Produce
the Most Milk at the Lowest Cost**



THERE is more digestible nutriment in a hundred pounds of Buffalo Corn Gluten Feed than in a hundred pounds of linseed oil meal or cotton seed meal.

You will find the *successful* dairyman feeding Buffalo Corn Gluten Feed—because they can safely feed two or three times as much in the ration—produce more milk—and sell their corn for more per ton than the cost of this feed.

A COMPETENT AUTHORITY STATES THAT IF THE FARMER COULD GET ALL OF HIS GRAIN FEED OR CONCENTRATES FOR NOTHING IT WOULD REDUCE THE PRICE OF MILK ONLY 1½ CENTS PER QUART.

Buffalo Corn Gluten Feed mixed with wheat bran, middlings, or other light feeds of similar character, three parts to one part of the light feeds, will give you a ration which will produce a maximum amount of milk at a low cost.

*See the Buffalo Corn Gluten Feed Dealer
He is a good man to know*

CORN PRODUCTS REFINING COMPANY

17 BATTERY PLACE

NEW YORK

Good Idea!

**Save Corn and Oats!
And Yet Make More Milk-Money**

Don't feed corn and oats to your cows. At their present prices, it's like throwing dollars in the feed box. Even if they are *home grown* grains, it will be far more profitable to feed

International Special Dairy Feed



Then you can sell those home grown grains and get a bigger profit from them. At the same time, your cows will be giving more milk. Think of what that means at present milk prices. You lower production costs and increase production at the same time. Just one ton of International Special Dairy Feed has \$20 more milk value than corn or oats.

Go to the nearest International dealer and place your order today. Don't take chances with any substitutes. Write direct to us if his supply is exhausted.

INTERNATIONAL SUGAR FEED CO.

MINNEAPOLIS, MINN.

Mills at Minneapolis and Memphis

Tell Advertisers Who Introduced You

Eggs! EGGS! EGGS!



YOU Mr. Poultry Raiser

want the largest amount of eggs in the shortest possible time.

LET US HELP YOU attain this result with

Maurer's "KWALITY" Meat Scrap
A TRIAL WILL CONVINCE YOU

Write for price and sample today
1918 Farmers' Almanac FREE upon request

Maurer Manufacturing Co.

Box E. 365, Newark, N. J.

Campus Notes

(Continued from page 276)

Below is the bill-of-fare of the dinner:

Fruit Cocktail
Baked Kidney Beans
Baked Stuffed Potatoes
Cabbage Salad
Johnny Cake Barley Bread
Cocoa
Vanilla Ice Cream
Oatmeal Cookies
Rye and Raisin Cookies
Salted Peanuts

Jessie E. Howell, a graduate student, won the competition for the best original poster to be used for "They Who Till," the play to be given Farmers' Week by the students of the College of Agriculture. The poster winning the competition will not be reproduced but is to be displayed as the original poster drawing.

Assistant Professor E. R. Minns has left his position in the farm practice department and is now the manager of Mrs. Seth Low's farm at Bedford Hills. He was a graduate of the Ohio State University and came to Cornell as an instructor.

J. B. Kirkland, '18, was the winner of the Pomology Stage competition held in Rochester the night of January 10, before the conference of New York State Fruit Growers' Association. Kirkland won the first prize of fifty dollars, speaking on, "Fruit Growing in the South." The second prize was awarded to Girard Hammond, '18, whose subject was "An Agricultural Federation."

Others who took part in the contest were: H. E. Blair, '18, who spoke on "An Economic Adventure," H. E. Botsford, '18, on "A Side for the Fruit Grower," and G. E. Peabody, '18, on "A Step Forward in Education."

(Continued on page 304)

Big Crops—Big Profits
Make every acre you plant unlock its fertility, release its plant-food by applying

**SOLVAY
PULVERIZED
LIMESTONE**

Pure grade, superior quality, highest percentage of carbonates. Finely pulverized—its fertilizing value shows in first harvest. Non-caustic; safe and easy to spread. Use it for big crops and profits. Get our Lime Booklet Free.

THE SOLVAY PROCESS CO.
Milton Avenue, Syracuse, N. Y.

Say Where You Saw It When You Write

ONE MAN CAN FARM MORE LAND *with the*



Plowing



Harrowing



Seeding



Cultivating



Mowing

MOLINE UNIVERSAL TRACTOR

"It Solves the Farm Help Problem"

TWO million men will be gone from the farms because of the war. Yet production of food must be increased. There is only one way—equip the men left on the farms so they can do more work than ever before.

With the Moline-Universal—the original two-wheel tractor—One Man can farm more land than was ever before possible, because—

One Man has power at his command equal to five horses, capable of doing the work of seven horses owing to its greater speed and endurance.

One Man operates the Moline-Universal Tractor from the seat of the implement to which it is attached, where he must sit in order to do good work.

One Man can start in the spring and go from one operation to another—plowing, harrowing,

planting, cultivating, mowing, harvesting grain or corn, spreading manure, filling the silo, cutting wood, etc., doing all farm work from one year's end to another, independently of horses or hired help.

Thousands of Moline-Universal Tractors are now at work under every conceivable condition in all parts of the United States and in Canada, England, France, Sweden, Norway, Denmark, Russia, Italy, Spain, Mexico, Peru, Argentina, Brazil, Cuba, Guatemala, South Africa, Australia. Wherever a Moline-Universal Tractor is sold, there is immediately a big demand for more.

Moline sales and service branches cover the country.

The Moline-Universal will solve your help and power problems. It is ready for you now. Write us today for free booklet giving full description of the Moline-Universal and name of your nearest Moline dealer.

Address Department 84

MOLINE PLOW CO., Moline, Illinois

For Fifty-Three Years Manufacturers of Farm Implements

Plows (Chilled & Steel)
Harrows
Planters
Cultivators
Listers
Stalk Cutters

Grain Drills
Hay Loaders
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Dump Rakes
Potato Diggers
Lime Sowers

Seeders
Grain Binders
Rice Binders
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Reapers

Spreaders
Scales
Wagons
Vehicles
Farm Trucks

Stevens Salient Six Automobile

Convert Your Rough Feeds Into Milk

Different kinds of roughage vary widely in nutritive value, especially protein, one of the chief elements of milk albumen, but all of the digestible nutrients contained in the roughage including protein are worth pound for pound just as much as those which are bought in concentrated feeds.

Much waste has been and is now incurred on Dairy Farms due largely to lack of attention to the quantity and nutritive value of the daily mess of roughage which is fed, and the failure to economically combine and proportion it with the concentrated feeds which are purchased. For example, if the roughage is low in protein, we should buy more protein in the concentrates, if on the other hand the roughage used is high in protein and low in carbohydrates, we should buy carbohydrates to balance them and not more protein which would be wasted.

It is to stop this loss and to economically combine the concentrates with the roughage grown on the farm so that the nutrients of both may be utilized that TIOGA DAIRY FEEDS are made in three brands, viz: Red Brand, White Brand and Blue Brand, each to fit a particular class of roughage. Feeding tables specifying quantities of every commonly grown roughage and the kind and quantity of TIOGA DAIRY FEED to be fed with it for most healthful maintenance and economical milk production, is contained in every bag of TIOGA DAIRY FEED or may be had for the asking.

The basic principle of economy in the use of feeds which will combine properly to render available the milk producing elements contained in the roughage grown on the farms, has never been questioned.

We guarantee TIOGA DAIRY FEEDS to be satisfactory when fed according to instructions. The principle on which they are based is correct. Why not ask your local dealer for a trial order, or write us for further particulars?

Tioga Mill & Elevator Co.
Waverly, N. Y.

Campus Notes

(Continued from page 302)

Friends of Mr. P. W. Classen, instructor in the natural history of the farm, will be glad to hear of his marriage to Miss Strong, the daughter of Chancellor Strong of Kansas State University.

The short course clubs of the College of Agriculture are now holding series of debates. The first of the series was held Friday, January 18, between the Stone and Craig Clubs. Other clubs including the Dairy, Rice, and Van Rensselaer, held a second series of debates on January 28. The clubs will follow the process of elimination, and the final contest will be held in Bailey Hall on Friday evening of Farmers' Week.

At the recent annual conference of county agricultural agents at the College of Agriculture, a resolution was adopted that the vice-director of extension at the College of Agriculture appoint a committee to investigate into the problem of better drainage laws and recommend such laws as they may deem necessary to the efficient improvement of drainage in this state. In accordance with this resolution, Professor M. C. Burritt, vice-director, of extension, recently appointed a committee on which are Professors Robb and Fippin and Mr. Robertson of the College.

Professor Lewis Knudsen of the department of botany has recently given up his work here and has left for the western front to serve with the Y. M. C. A.

Some of the members of the class in poultry judging recently took an interesting trip to the Madison Square Garden Poultry Show and afterward visited the Yama Farms at Napanoch. The manager of the farms personally conducted the tour of the plant and also very generously served a light lunch to a crowd of very hungry men. Shortly

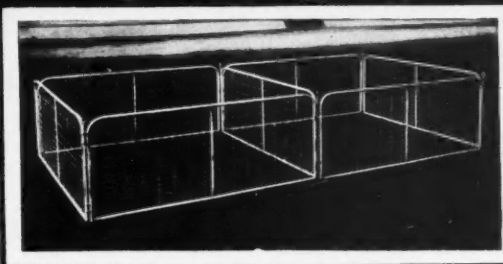
(Continued on page 306)

Say Where You Saw It When You Write

Square Deal Hog Panels-

for Breeding, Sorting & Exhibition Pens

**Used by
Dozens
of Agri-
cultural
Colleges**



**No Posts
Bolts or
Wrench
needed**

Panels made without wraps, bolts or projections. No posts—no nuts or wrench required to put panels together. Just slip rods into place and pen is ready for use (rods furnished). Dimensions, 3 ft. high, 8 ft. long (also other sizes).

Weights about 50 pounds, easily handled by one man; unusually durable. Compact and neat, easily taken down, takes up very little space when not in use. Just what you want—write TODAY for special circular on Stock and Exhibition panels.

Square Deal Gates Guaranteed 5 Years

A New "Square Deal" Gate FREE if any part breaks within 5 years—this farm gate is different from all others. No joints—no nails or bolts—no malleable fittings—no joints to break. Made

without wrapping the wires around frame—strong self-locking latch—lasts a lifetime. When asking for Panel circular ask us also to send "Square Deal" Gate Folder. WRITE NOW.

Keystone Steel & Wire Co. Dept. A-7 Peoria, Ill.

Swift's

Red Steer Brand

Fertilizers

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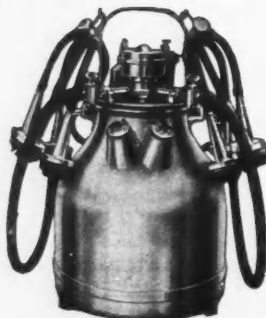
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Campus Notes

(Continued from page 304)

after this, the boys started in training for cross-country by first indulging in a preliminary mile and a half run to the station at Napanoch. The real race began at Kingston where the distance between the stations was a mile and a half but really was considerably further, they say. The professor in charge soon took the lead but was closely followed by two of his quick students; the rest of the bunch hung together some distance behind and consequently arrived in time to see a rapidly vanishing tail light.

Short course students in poultry took a trip to some of the commercial farms near Richfield Springs directly following their Christmas recess. Among others, they visited the farm of C. A. Rogers who was formerly in the poultry department of this College.

Professor Ross recently returned from the University of Chicago where he has been studying for some time.

Mr. G. C. Supplee attended a recent meeting of the American Bacteriological Society at Washington, D. C.

At a recent meeting of the New York State Dairyman's Association, Professor H. C. Troy was elected vice-president and Professor W. A. Stocking one of the directors. Prof. H. H. Wing gave an interesting address on the Dairy Cow and the Cost of Milk Production.

The New York State Breeders' Association held its annual meeting in Syracuse, January 8, 9, and 10. President Schurman spoke on, "Food Problems, National and State," Dean Moore of the Veterinary College, on the "Control of Hog Cholera," and Professor M. J. Smith of the College of Agriculture on "Farm Flock Husbandry."

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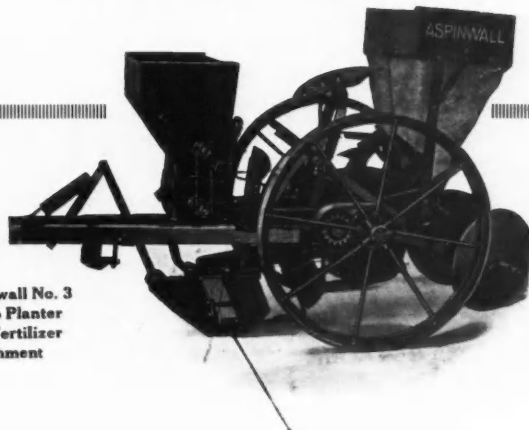
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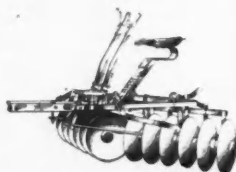
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Former Student Notes

(Continued from page 278)

'15, M. S. A.—Sarkars Boshnakian has been employed by the Government in cereal investigation thruout the summer and early fall.

'15, B. S.—Miss Estella L. Church was a teacher of domestic economy in Worcester High School during 1915 and 1916. In September, 1916, she married Herman C. Wright of Worcester, where they are now living.

'15, B. S.—Lawrence S. Phillips, formerly a teacher of agronomy in New York State School of Agriculture at Morrisville, has been drafted and is now at Camp Dix, New Jersey, in the Depot Brigade 153, Battery 5, and Company 18.

'15, B. S.—Alvin A. Jagger was killed in an automobile accident while returning from Marion to his home at East Palmyra on the evening of September 27. The car overturned at a sharp turn in the road. At the time of his death, Mr. Jagger was in business with his father at East Palmyra. Ivan C. Jagger, his older brother, is professor of plant pathology at Rochester University.

'16, B. S.—Paul F. Sanborn is now at the flying school at Lake Charles, Louisiana, being transferred from the school at Mt. Clemens, Michigan.

'16, B. S.—James Donald McCutcheon received a commission at the officers training camp at Fort Ogelthorpe, Georgia, as first lieutenant, Field Artillery, O. R. C. He has been assigned to Battery D, 316th Field Artillery, Camp Jackson, Columbia, South Carolina.

'16, B. S.—William H. Jameson, Jr., is a lieutenant, Infantry, O. R. C. On November 30, he was married to Miss Mary Carolyn Gard of Glendora, California.

(Continued on page 310)

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" 15--Yale at New Haven

" 16--Dartmouth at Hanover

" 22--Pennsylvania at Phila.

" 23--Princeton at Princeton

" 27--Columbia at Ithaca

Mar. 2--Rochester at Rochester

" 6--Colgate at Ithaca

" 9--Yale at Ithaca

" 11--Dartmouth at Ithaca

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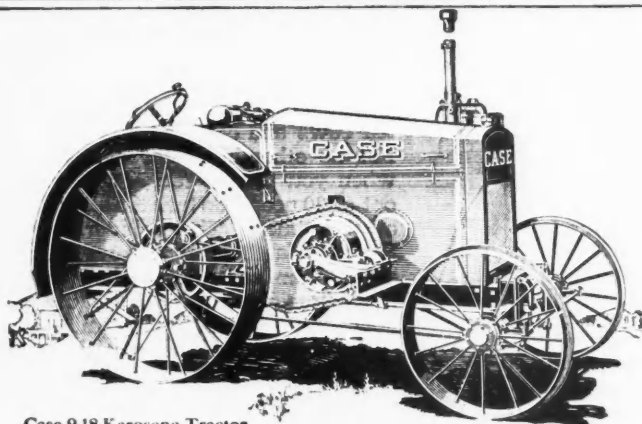
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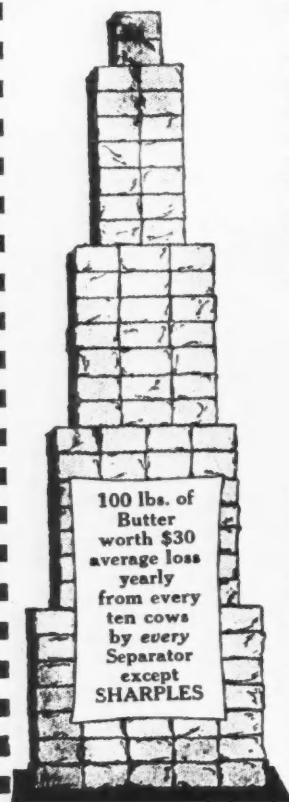
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